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INTERNATIONAL JOINT COMMISSION

*Canada) 1909 -*

## HEARINGS

ON THE REFERENCE BY THE UNITED STATES  
AND CANADA

IN RE

# LEVELS OF THE LAKE OF THE WOODS

AND ITS TRIBUTARY WATERS AND THEIR FUTURE  
REGULATION AND CONTROL

BEING

### FINAL PUBLIC HEARINGS

AT INTERNATIONAL FALLS, MINN., JANUARY 28-29, 1916,  
AND WINNIPEG, MANITOBA, FEBRUARY 1-4, 1916



WASHINGTON  
GOVERNMENT PRINTING OFFICE  
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INTERNATIONAL JOINT COMMISSION.

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CANADA.

CHARLES A. MAGRATH, CHAIRMAN.  
HENRY A. POWELL, K. C.  
P. B. MIGNAULT, K. C.

LAWRENCE J. BURPEE, *Secretary.*

UNITED STATES.

OBADIAH GARDNER, CHAIRMAN.  
JAMES A. TAWNEY.  
R. B. GLENN.

WHITEHEAD KLUTTZ, *Secretary.*



## LETTER OF REFERENCE.

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DEPARTMENT OF STATE,  
*Washington, June 27, 1912.*

INTERNATIONAL JOINT COMMISSION  
OF THE UNITED STATES AND CANADA,  
*Washington, D. C.*

SIRS: I have the honor to inform you that at the joint request of the Government of the United States and of the Government of the Dominion of Canada, under the provisions of Article IX of the treaty of January 11, 1909, between the United States and Great Britain, the questions or matters of difference set forth below, which have arisen between them involving the rights, obligations, or interests of each in relation to the other or to the inhabitants of the other, along their common frontier between the United States and the Dominion of Canada are hereby referred to the International Joint Commission for examination and report upon the facts and circumstances of the particular questions and matters referred, together with such conclusions and recommendations as may be appropriate.

The questions so referred are as follows:

1. In order to secure the most advantageous use of the waters of the Lake of the Woods and of the waters flowing into and from that lake on each side of the boundary for domestic and sanitary purposes, for navigation and transportation purposes, and for fishing purposes, and for power and irrigation purposes, and also in order to secure the most advantageous use of the shores and harbors of the lake and of the waters flowing into and from the lake, is it practicable and desirable to maintain the surface of the lake during the different seasons of the year at a certain stated level; and if so, at what level?

2. If a certain stated level is recommended in answer to question 1, and if such level is higher than the normal or natural level of the lake, to what extent, if at all, would the lake, when maintained at such level, overflow the lowlands upon its southern border, or elsewhere on its border, and what is the value of the lands which would be submerged?

3. In what way or manner, including the construction and operation of dams or other works at the outlets and inlets of the lake or in the waters which are directly or indirectly tributary to the lake or otherwise, is it possible and advisable to regulate the volume, use, and outflow of the waters of the lake so as to maintain the level recommended in answer to question 1, and by what means or arrangement can the proper construction and operation of regulating works or a system or method of regulation be best secured and maintained in order to insure the adequate protection and development of all the interests involved on both sides of the boundary, with the least possible damage to all rights and interests, both public and private, which may be affected by maintaining the proposed level?

I have the honor to add that the Government of the United States will be glad to assist the commission in obtaining any information which it may desire in the course of its investigation of the matters herein referred for its examination and report.

I am, sirs, your obedient servant,

P. C. KNOX.







## HEARINGS OF THE INTERNATIONAL JOINT COMMISSION IN RE LEVELS OF THE LAKE OF THE WOODS.

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INTERNATIONAL JOINT COMMISSION,  
INTERNATIONAL FALLS, MINN.,  
*Friday, January 28, 1916.*

A committee of the commission, consisting of Mr. James A. Tawney and Mr. P. B. Mignault, met, pursuant to notice, in the courthouse at International Falls, Minn., on Friday, January 28, 1916, to hold additional public hearings in re the levels of the Lake of the Woods.

The meeting was called to order by Mr. Tawney at 2 o'clock p. m.

Mr. TAWNEY. Gentlemen, when the International Joint Commission met here at International Falls last September it was for the purpose of hearing testimony as to the extent and value of certain lands along the shores of Rainy Lake and tributary waters that would be submerged at certain levels. The necessity for taking this testimony arises from the fact that by the reference from the two Governments the commission is called upon to report the extent of the lands that would be submerged at the level the commission may recommend at which the Lake of the Woods can be regulated, and the value of those lands.

Rainy Lake is an essential and a very important factor in the regulation of the levels of the Lake of the Woods, and, of course, any land that may be submerged as the result of providing storage capacity on the Lake of the Woods would necessarily, at least by implication, be included in the reference. When the commission was here before the riparian owners along the shores of Rainy Lake were not prepared to present their evidence, either as to the extent or value of the lands affected. Thereupon, the commission decided to adopt some other method of arriving at these facts. Subsequently, at Kenora, by order of the commission, Mr. C. A. Magrath, of Ottawa, the chairman of the commission in Canada, and myself were appointed a committee to return to International Falls at such time as we determined upon, for the purpose of receiving testimony on these questions. After a conference with Mr. Magrath, we fixed upon this date for the taking of the testimony, and the interested parties, as well as their legal representatives, were duly notified of this meeting, which was to have begun at 10 o'clock this morning. Owing to the severe storm, which has interfered with transportation, the Canadian member of the commission has not been able to reach International Falls, but inasmuch as we are not authorized to determine anything, but merely to act, as it were, as masters in chancery for the taking of



testimony, and also because there are, I understand, a great many people here who desire to be heard, I have concluded not to delay beginning the taking of this testimony any longer. Representatives of the State of Minnesota will present first such testimony as they desire to offer in behalf of the State in respect to the lands owned by the State that are now or may be affected on the shores of Rainy Lake and the waters tributary to that lake.

I trust that no one present will think that I am acting improperly in the matter. It is solely for the purpose of saving as much time as possible and in order also to insure everyone being heard before we leave to-morrow night for Winnipeg, where the commission will meet on February 1 for the purpose of hearing those on both sides of the line who are interested in water-power development. I will not attempt to hear anyone upon the other side until the Canadian member of the commission arrives, and, as all the testimony that is taken here will be reported to and ultimately approved by the full commission, the rights of no one will be jeopardized in the least. If anyone desires to object to my proceeding before my colleague arrives, they are at liberty to do so, and their objection will be sustained, because I do not intend to proceed unless it is entirely satisfactory to everybody concerned.

Mr. CAMPBELL. There is no objection that I know of, Mr. Tawney, to your going on.

Mr. TAWNEY. If there is no objection, gentlemen, to my going on and taking the testimony, we will now proceed, beginning with the State of Minnesota, and I presume that before we conclude Mr. Mignault, who will take the place of Mr. Magrath, will have arrived.

I will first ask the gentlemen who are present to state for the record, their names and addresses and whom they represent.

The following appearances were announced:

Adolph F. Meyer, Minneapolis, Minn., consulting engineer to the commission.

C. J. Rockwood, Minneapolis, Minn., and Harris Richardson, St. Paul, Minn., representing the Rainy River Improvement Co., the Minnesota & Ontario Power Co., the Keewatin Lumber Co., and the Keewatin Power Co.

Isaac Campbell, K. C., Winnipeg, Canada, representing the city of Winnipeg.

R. J. Waugh, mayor of the city of Winnipeg, representing the city of Winnipeg.

Clifford L. Hilton, St. Paul, Minn., assistant attorney general, State of Minnesota, representing the State of Minnesota.

J. A. O. Preus, St. Paul, Minn., auditor for the State of Minnesota.

John E. Samuelson, Duluth, Minn., representing a number of riparian owners.

L. A. Berg, Duluth, Minn., representing two riparian owners.

W. T. Moodie, Winnipeg, Canada, representing the Canadian Northern Railway.

C. E. Berkman, Chisholm, Minn., representing the interests in the sixth congressional district of Minnesota.

Andrew D. Rahn, Minneapolis, Minn., representing the Shevlin-Clarke Lumber Co., of Fort Frances, Ontario.



Mr. TAWNEY. Gentlemen, when the commission was here in September last our consulting engineers made a full statement regarding the subject matter of the investigation, as well as the surveys which they had made. Is there any further information desired by anyone than that which was presented by the engineers at that time? If so, Mr. Meyer, one of the American consulting engineers, is present, and I will call him first.

Mr. RICHARDSON. I suppose Mr. Meyer will be here to-morrow also?

Mr. TAWNEY. Mr. Meyer will be here until the hearings are concluded; yes, sir. Mr. Hilton, you may now proceed with the presentation of such evidence as you desire to offer. I wish to say at the outset that every opportunity will be given to every interested party to ask questions, either on direct or cross examination, just the same as in any other matter of controversy between parties.

### TESTIMONY OF MR. J. A. O. PREUS, AUDITOR FOR THE STATE OF MINNESOTA.

J. A. O. PREUS, after being duly sworn, testified as follows:

Mr. HILTON. What is your full name, Mr. Preus?

Mr. PREUS. My name is J. A. O. Preus.

Mr. HILTON. What official position, if any, do you hold in the State of Minnesota?

Mr. PREUS. State auditor.

Mr. HILTON. When did you assume that position?

Mr. PREUS. On January 1, 1915.

Mr. HILTON. Were you present at the hearing of the International Joint Commission at International Falls on September 10 last?

Mr. PREUS. Yes, sir.

Mr. HILTON. At that time did you make a statement, and if so, what, relative to the furnishing of information for the commission as to the State property likely to be injuriously affected by the raising of the waters on these lakes?

Mr. PREUS. I did, and that statement will be found beginning on page 310 of the printed record of the International Joint Commission, entitled "Hearings of the International Joint Commission on the reference by the United States and Canada in re levels of the Lake of the Woods and its tributary waters and their future regulation and control."

Mr. HILTON. Did you after that date receive any communication from the commission or one of its secretaries relative to the securing of that information?

Mr. PREUS. I did. On September 18 Mr. Kluttz, the secretary of the commission, directed a letter to me, in which the following resolution passed by the International Joint Commission is recorded:

The secretary for the United States is directed to communicate with the State auditor of Minnesota, requesting him to file with the commission a verified statement showing the location and value of State-owned lands that might be injuriously affected by any level the commission might recommend.

Mr. HILTON. Are you familiar with any statutes or constitutional provisions relative to State lands, their valuation, or disposition?

Mr. PREUS. Yes, sir.

Mr. HILTON. Will you refer to such as you have in mind?



Mr. PREUS. I refer to section 5219 of the general statutes of Minnesota of 1913. That part which I deem of importance in reply to your inquiry reads as follows:

Whenever in the opinion of the land commissioner of the State of Minnesota it will be necessary for the public interest that an appraisal of any of the school or other State lands should be made he shall appoint one appraiser, who shall be one of the regularly employed State cruisers and who shall not be a resident of the county in which the lands to be appraised are situated, and notify the governor, who shall appoint one appraiser who may be a resident of such county. The land commissioner shall also notify the commissioners of such county, who shall appoint a third appraiser. Such appointments by the governor and county commissioners shall be made within 30 days after such notice. Each appraiser shall, before entering upon the duties of his office, take and subscribe an oath before such person qualified to administer oaths that he will faithfully and impartially discharge his duties as appraiser according to the best of his ability, and that he is not interested, directly or indirectly, in any of the school or other State lands or improvements thereon, and has entered into no combination to purchase the same or any part thereof, which said oath shall be attached to the report made of such appraisal. Said appraisers after taking oath of office shall proceed to view and appraise such lands and the improvements thereon and make a report thereof to the land commissioner as he may direct. The valuation of such lands and the timber shall each be made and stated separately in the appraisement, and the minimum price established by such appraisal shall be the minimum price for such lands until changed by subsequent appraisal. No school or other State lands shall be sold until so appraised, nor for a less price than \$5 per acre.

Mr. HILTON. Have you some other section that has a bearing upon your duties as State auditor in connection with lands?

Mr. PREUS. Yes, sir; section 65 of the general statutes of Minnesota for 1913. That portion of the statute which I deem of importance is that which reads as follows:

The State auditor shall superintend and manage the fiscal concerns of the State as required by law, and has general supervision of all lands owned by the State or in which the State is interested as trustee, and of the leasing, sale, or other disposition thereof.

Mr. HILTON. I call your attention to section 2 of article 8 of the State constitution, without you having read it, and ask you if that also has reference to State lands and their disposition?

Mr. PREUS. Yes; that section of the constitution provides substantially that the State auditor shall be ex officio land commissioner of the State.

Mr. TAWNEY. Is that the section of the constitution that also fixes the minimum price at which the land shall be sold?

Mr. PREUS. Yes, sir.

Mr. CAMPBELL. Is the price the same?

Mr. PREUS. Yes, sir; \$5 per acre.

(Art. 8 of the constitution of the State of Minnesota is as follows:)

ART. 8. School funds: Education and science. Uniform system of public schools. The stability of a republican form of government depending mainly upon the intelligence of the people, it shall be the duty of the legislature to establish a general and uniform system of public schools.

(2) School and swamp lands—school funds from sale of—the proceeds of such lands as are or hereafter may be granted for the use of schools within each township in this State shall remain a perpetual school fund to the State, and not more than one-third of said lands may be sold in 2 years, one-third in 5 years, and one-third in 10 years, but the lands of the greatest valuation shall be sold first, provided that no portion of said lands shall be sold otherwise than at public sale. The principal of all funds arising from sales or other disposition of lands or other property granted or intrusted to this State in each township for educational purposes shall forever be preserved inviolate and undiminished, and the income arising from the lease or sale of said school



land shall be distributed to the different townships throughout the State in proportion to the number of schools in each township between ages of 5 and 21 years, and shall be faithfully applied to the specific objects of the original grants or appropriations. Suitable laws shall be enacted by the legislature for the safe investment of the principal of all funds which have heretofore arisen or which may hereafter arise from the sale or other disposition of such lands or the income from such lands accruing in any way before the sale or disposition thereof in interest-bearing bonds of the United States or of the State of Minnesota issued after the year 1860; or of such other State as the legislature may by law from time to time direct. All swamp lands now held by the State or which may hereafter accrue to the State shall be appraised and sold in the same manner and by the same officers, and the minimum price shall be the same, less one-third, as is provided by law for the appraisalment and sale of the school lands under the provisions of title 1 of chapter 38 of the General Statutes. The principal of all funds derived from sales of swamp lands as aforesaid shall forever be preserved inviolate and undiminished. One-half of the proceeds of said principal shall be appropriated to the common school fund of the State; the remaining one-half shall be appropriated to the educational and charitable institutions of the State in the relative ratio of cost to support said institutions.

Mr. HILTON. Mr. Preus, were appraisers appointed in accordance with the provisions of the statute which you read, and did they qualify and make examinations of the lands and submit their reports to you?

Mr. PREUS. They were appointed, qualified, and have made the examination substantially as requested by the commissioner.

Mr. HILTON. When were those examinations completed?

Mr. PREUS. Within the last 10 days.

Mr. HILTON. And so it was not practicable for you to have these appraisal sheets verified and ready for the commission prior to this time, as requested in that letter?

Mr. PREUS. No; that was impossible.

Mr. HILTON. You have them here?

Mr. PREUS. I have the originals with me at this time.

Mr. HILTON. Now, Mr. Commissioner, we have here various original appraisals made by the appraisers that Mr. Preus has referred to. We can offer those in evidence and have them received with the request that they be withdrawn and copies substituted for them, or we have copies here in typewritten form and certified which we will offer in evidence and leave with the commission.

Mr. TAWNEY. That will be entirely satisfactory to the commission.

Mr. RICHARDSON. We will enter an objection to this form of testimony, unless the appraisers are produced here by the State for cross-examination. I would like to ask Mr. Preus a question in that connection.

Mr. TAWNEY. Very well, you may ask him any preliminary question you wish.

Mr. RICHARDSON. Mr. Preus, you stated that the appraisers had made the examination?

Mr. PREUS. Yes, sir.

Mr. RICHARDSON. Did you mean to state that you knew, of your own knowledge, that the appraisers had made the examination, or did you mean to say that they had reported to you that they had made it?

Mr. PREUS. Your question is a dual one. You want me to answer first whether or not I know of my own knowledge that they have

made the examination. If I should answer that in the affirmative, do you mean, Mr. Richardson, that I should have trailed them around these lakes here to see whether or not they had made the appraisements?

Mr. RICHARDSON. I should think you would have been present if you know it of your own knowledge.

Mr. PREUS. Well, I was not present. I did not make the appraisal myself.

Mr. RICHARDSON. You know nothing as to whether or not they made an examination and appraisal, except what they reported?

Mr. PREUS. That is correct.

Mr. TAWNEY. Are the reports verified by the appraisers?

Mr. PREUS. Yes, sir.

Mr. RICHARDSON. We will enter an objection on the grounds that this evidence is not proper and not admissible, and that the appraisers should be present here in person for examination.

Mr. SAMUELSON. Mr. Chairman, Mr. Richardson, who has made the objection to the introduction of this evidence, has stated that we object. May I be advised as to who the "we" that he refers to represent, so we may know from whom the objection comes?

Mr. TAWNEY. I understood that his appearance, with that of Mr. Rockwood, was on behalf of the Minnesota & Ontario Power Co. I assume, therefore, that the objection is made on behalf of those he represents—the Minnesota & Ontario Power Co.

Mr. ROCKWOOD. And others, all those who are named in the record.

Mr. TAWNEY. These reports of the appraisers will be received, notwithstanding the objection, and the objection will have to be subsequently passed upon by the full commission when the testimony is reported to it. I would say, Mr. Richardson, that under the reference the commission is required to report the fact as to the extent of land submerged at the level of the Lake of the Woods we may recommend. That level may or may not affect the level of Rainy Lake. If the regulation of the Lake of the Woods requires any change in the level of Rainy Lake it will then be necessary for the commission to state in its final report the extent of the lands that would be affected by the change in the level of Rainy Lake, and the value of those lands. This will not be a judicial determination of the fact. When the report and recommendations of the commission are made, the Governments, by a subsequent reference, under the treaty of January 11, 1909, may require the commission to report on specific tracts of land that are affected, or the two Governments, by a subsequent convention, may accept the value as reported by the commission and make some provision satisfactory to both Governments for compensation for the lands submerged as a result of their accepting the recommendation of this commission. Now, if that is done, in order to ascertain who is entitled to compensation there will have to be a further reference or further investigation. It is not incumbent upon the commission under the existing reference, as I view it, to report specifically on each tract of land. If you will read the reference you will see that it refers to the aggregate value of the land that will be submerged and we are required to report the aggregate value only. So it is not a judicial or a final determination of the question of value and I do not think that anyone would be bound, in court or elsewhere, by the finding or the recommendation



of the commission. So that the recommendation of the commission will not, in any way, affect the right of either the land-owner or those who may be called upon by the two Governments to compensate the land-owner as to the value. It is merely for the information of the two Governments that we are to report on the value of this land, that is the value of the land in the aggregate, that is affected by or submerged at the level of the Lake of the Woods which we may finally recommend to the two Governments. In other words, the recommendation will not have the effect of a judicial determination or be *res judicata*.

I merely state this at this time, so that you will understand that the duty of the commission under this particular article of the treaty is not judicial and it is not final—it is investigative. Our jurisdiction under this article is purely investigative, and we are only called upon to report what our best judgment is as to the value of the lands that would be submerged. We are not called upon to apportion to the individual owners the value of their particular lands. So that I do not think there is that necessity for particularity and adherence to the established rules of evidence in taking this testimony that otherwise would obtain. If the commission were called upon to render a final decision as to the value of the lands, then I grant you that the rules of evidence that should be followed would be the same rules that would govern in a court of justice, but for the purpose of this investigation it does not appear to me that there is that necessity that would obtain where the decision upon the question was final, because we are simply furnishing to the two Governments the best information on the subject we can obtain. We are not required by the Governments to follow any particular form of ascertaining this value. We have adopted this form of ascertaining the value by giving all the parties an opportunity to appear and present their testimony, so that there shall be no reason for the people on either side of the line to complain that the commission had arrived through any star chamber process at its conclusion with respect to the value of the lands. Our hearings have all been open. It is an investigation and not a determination. That is the distinction between this investigation and any question submitted to the commission under Articles III, IV, or X. This question has been referred to the commission under Article IX, wherein it is expressly provided that our reports shall not have the effect of final determination. Of course, it is different from what it would be if the matter were referred to the commission under any of the other three articles that I have named. So that I do not think that the same strict rules of evidence should be followed. However, that is a matter for the commission to determine, and, so far as this committee is concerned, we will take such testimony as is presented, subject to such objections as may be made, and the commission will hereafter determine whether or not the testimony shall be received. If it is not received, we shall have to adopt some other method of ascertaining the value of these lands.

I wanted to make that as clear as I could, so that you would understand that the committee is disposed to give everybody a fair opportunity to be heard and to interpose any objection and state the grounds for such objection. We do not want it understood that this

is a final determination or that it will have the effect of an arbitral award.

Mr. SAMUELSON. That statement clarifies the situation to my mind. At the time the commission met before I was somewhat taken aback by what was said, as I then thought that the commission met in the nature of trying to make an award.

Mr. TAWNEY. I do not think you were justified in drawing that conclusion, because both at Warroad and here I expressly stated that the commission was neither authorized nor empowered to make any award or final decision. I know the gentlemen who were present at Warroad will remember my making that statement, and I think the record will bear me out that I also made the statement here.

Mr. SAMUELSON. I had gotten an erroneous idea as to it.

Mr. TAWNEY. In all matters referred to the commission under Articles III, IV, and X of the treaty, our decisions are absolutely final and binding upon both Governments, but in all matters referred under Article IX it is the duty of the commission to investigate and report upon any question referred to it for investigation, by one Government with the consent of the other, and it is under Article IX that this investigation is being conducted.

Mr. RICHARDSON. I wish to say in regard to this evidence that I entered my objection to it because it did not seem to me to be evidence of a character which would amount to anything in assisting either the committee or the commission to reach a conclusion. It is easy enough to prepare a sheet of paper and put certain statements on it and have it signed. It has, perhaps, under authority of the State of Minnesota, a face value that it would not have if it were merely a letter from an individual. We know nothing as to the source of what is set forth, or attempted to be set forth, in these written statements. It is impossible for anybody to know what they mean, what limitations should be put upon them, or what angle they should be viewed from, until the men who did the work, if it was done, are brought here. We stand here, all of us, I suppose, really at the request of the two Governments, for the purpose of presenting to the two Governments, through the committee first, and then through the commission, a true picture of the situation, not an artificial picture, not an imaginary fragment, and it has seemed to me that above all the State of Minnesota should come forward with fundamental evidence, evidence that would mean something, not exaggerations, not twistings and turnings to accomplish some purpose, but with real evidence to enlighten this committee, to get into the record the actual facts from men who know, not those who assume to know. And what are we confronted with?

Mr. TAWNEY. Pardon me, Mr. Richardson, for interrupting you, but assuming your statement to be correct, could anyone employed by the State who was authorized and directed under the statute to make an appraisement report a less value than the minimum value fixed by the constitution of the State at which the lands are to be sold?

Mr. RICHARDSON. The land commissioner and the auditor—one and the same person—probably would not receive any such report.

Mr. TAWNEY. But would they have any authority under that statute, which expressly provides that not less than \$5 an acre shall be reported, to submit a report containing a less price? While



it represents the minimum value at which the land should be sold, it may not represent the actual market value of the land, but the officer of the State can not report a less value than that which is fixed by the State.

Mr. RICHARDSON. I wish to call attention to the fact that when that statute was passed it was passed at the instance and as the bill of a joint investigating committee appointed by the House of Representatives of the State of Minnesota and by the Senate of the State of Minnesota, and that I was counsel for that committee and drew that statute under the direction of the committee. I do not mean to be understood as saying that that is the foundation statute on the subject. There was already a statute and it became necessary in the minds of the people of this State to tighten up matters for certain reasons in regard to the public lands of the State, because an investigation had been conducted covering a period of nearly three years and comprising all of the affairs of the State auditor's office, which led the legislature to the action that it took, and my interpretation of the statute is that these values which the appraisers returned had nothing whatever to do with any actual value, for the actual value may be below \$5. As to whether it is below \$5 or at \$5 or above \$5, no human being can determine from these certificates that the State auditor and land commissioner now produces. The chairman will see at a glance that until someone testifies that the lands embodied in the descriptions contained in the certificates have a value at least equal to \$5, the certificates are absolutely worthless, because notwithstanding they are here, every foot of the land may be worth a lot less than \$5.

Mr. PREUS. Mr. Commissioner, I do not believe that Mr. Richardson has examined these reports. I am quite positive that he has not. If he had I feel equally certain that he would find a great deal of valuable information in them. The State of Minnesota does not dispose of its lands at less than \$5 per acre. Therefore, I do not believe that the power company, which Mr. Richardson represents, should be permitted to destroy these lands of the State of Minnesota at a cheaper price than that at which we will dispose of them to the settlers.

Mr. RICHARDSON. The State auditor, I think, is assuming something that he does not know of his own knowledge, and that is contained in the statement which he has now put into the record, that the power company is destroying these lands. I suppose that is a matter to be arrived at by evidence. It is true, and he is correct in his statement that I have not examined these certificates. I saw one page as the certificate was drawn out and offered in evidence, simply because it happened for a second to have lain on the table face up. I saw enough in that glance to lead me to the conclusion that for some reason or other the State was not prepared here to enlighten either the committee or the commission with actual conditions.

Mr. HILTON. Mr. Commissioner, the State of Minnesota is not attempting to turn anything or to twist anything, as Mr. Richardson said in one of his several speeches that we have listened to, but we have come here before the committee at this time with just exactly what the International Joint Commission has asked us to bring, and we have complied with their request in every way. The statement that

Mr. Preus made that these lands cannot be sold by the State for less than the constitutional price is true and correct; nor can they be taken from the State, according to the decisions of our supreme court, even in condemnation proceedings, at less than the minimum price of \$5 an acre. The presumption that obtains under the law is that the officers of the State, among whom were these appraisers, would do their duty. They have made the appraisement, as Mr. Preus has stated, in exact accordance with what the law provides.

Mr. TAWNEY. Mr. Hilton, has the Supreme Court of Minnesota ever decided that question as to the price of not less than \$5 an acre for the State lands?

Mr. HILTON. Our supreme court in the case of the application of the Indian school district of Virginia to condemn certain lands, reported in 124 Minnesota, I think at page 172, held that State lands could be taken in condemnation proceedings. It was contended by our office that they could not. The Indian school district of Virginia was attempting to get some 67 or 68 acres of State lands for use as an agricultural station, and we took the position that because the constitution said that these lands could not be sold otherwise than at public auction they could not condemn the lands and take them. The supreme court in that decision, in effect, held that condemnation proceedings had all of the essential elements of a public sale, and it went on and said further that all of the rights of the State in and to those lands were safeguarded and protected; that the minerals, for instance, could not be taken because they are reserved under statute. The court does not use the exact language that they may not be taken in condemnation proceedings for \$5 an acre, but it puts it in a state that conveys that impression. It makes no difference whether the land is sold at public sale or taken in condemnation proceedings, the minimum price is the lowest price at which they can be taken in condemnation proceedings.

Mr. TAWNEY. In fixing that minimum price, do you think that it was fixed with reference to the fact that all State land was worth at least \$5 an acre?

Mr. HILTON. That is the idea, I presume. The people of this State in adopting a constitution said that \$5 was the price at which those lands should be sold. That is what the State says the lands are worth, and they cannot be taken in any kind of proceeding unless that price is paid, and if the International Joint Commission is determining how much the damage is going to be if these lands are going to be taken, I presume we have here the information you want.

Mr. TAWNEY. We will receive the statements, and you can withdraw the originals and file certified copies in duplicate.

Mr. RICHARDSON. I have now had an opportunity to examine the certificates, and I wish to enter a further objection on the ground that the certificates are not in proper form.

Mr. HILTON. What certificates?

Mr. RICHARDSON. The ones attached.

Mr. HILTON. We have not offered these yet, and I have offered to substitute original copies. I will offer the originals. They will be received in evidence, the commissioner says, and then I will offer copies of the pages which give the information that the commission has asked us to produce.



Mr. ROCKWOOD. Mr. Commissioner, just one second, please. I want to call attention to what I think is an error in the statement of the constitutional provision. The section is cited and can be easily referred to. The schools' minimum price is \$5 an acre. The price of swamp land is one-third less than that. Am I wrong about that, Mr. Hilton?

Mr. HILTON. The statute says all land; and there is another constitutional provision that refers to internal improvement land that makes it \$5.

Mr. ROCKWOOD. One thing more. I do not think that these provisions of the constitution of the State of Minnesota, nor the statutes of the State of Minnesota, are controlling if Congress shall see fit to take these lands by power of eminent domain.

Mr. TAWNEY. I understand that your position is that if the commission finds that the actual value of the land is less than the minimum fixed for the sale and so reports to the two Governments, the two Governments may or may not accept the valuation, or they may take the minimum valuation fixed by the constitution?

Mr. ROCKWOOD. Yes; they may take the actual valuation.

Mr. TAWNEY. They may take the actual valuation of the land notwithstanding the constitution?

Mr. ROCKWOOD. That is it.

Mr. SAMUELSON. Mr. Commissioner, may I suggest that the objection is somewhat captious, as this is merely for the information of the commission. The land values in this particular part of the country change from time to time. By the time the two Governments would, if the necessity arose, take this land there would be an entirely different price, probably, from the price that is now fixed. For that reason the present objection of counsel as to these values is rather captious.

Mr. TAWNEY. Be that as it may, we will proceed, Mr. Samuelson. (At this point of the proceedings Commissioner Mignault entered and took his place as a member of the committee.)

Mr. HILTON. With the consent of the commissioners, Exhibit Minnesota B1 is substituted for Exhibit Minnesota B, it showing the return of the appraisers in regard to the lands therein described situate in Koochiching County, Minn., as appearing upon the front pages of Exhibit B.

Minnesota Exhibit A1, with the consent of the commissioners, is substituted for Minnesota Exhibit A, the same being the appraised valuations of the lands therein referred to as appearing upon the first page of each sheet thereto attached. Minnesota Exhibits A1 and B1 so substituted are offered. They are explanatory of the appraisal made pursuant to law and in accordance with the request of the commission, and they do not contain upon their backs a blank filled out as do appear in the originals, Exhibits A and B.

Now, I may say for the benefit of the commission that we have prepared and have ready to introduce a memorandum of sales made in townships 69, 70, and 71, ranges 23 and 24 west, Koochiching County, Minn.

Mr. TAWNEY. Does the auditor know anything with respect to the relative location of the lands to which you have referred in the certificates of sales of the land appraised in Koochiching County?

Mr. PREUS. I will say, Mr. Commissioner, that they were compiled by Mr. Case, the chief cruiser of my office; one copy being for our use and one copy for Mr. Rockwood. They were prepared to show what the prices of land have been in these immediate vicinities where the Lake of the Woods and Rainy Lake are now flooding some of the lands.

Mr. HILTON. I may say that when it comes to the technical rules of the admission of evidence, in establishing values in condemnation proceedings, the particular sales that may have been made are not admissible at all, but we are prepared, and hold ourselves in readiness to furnish, this commission with all possible evidence that may be of benefit to it. We have prepared these and will offer them; they may be received or not.

Mr. TAWNEY. I would say, Mr. Hilton, that this commission is to judge of the fact as well as the law, although we can not determine either the fact or the law in this particular case; nevertheless, anything that will assist the commission in arriving at a fair judgment as to the value of these lands will be received.

Mr. RICHARDSON. We will enter an objection to these as not proper evidence, immaterial, incompetent, and as not having had sufficient foundation laid for them.

Mr. BERKMAN. At Warroad the representative of the power companies offered, and the commission received in evidence, the tax lists of the county showing the taxable valuation of the land; and since they pursued that policy there it is not just tenable for them to change it over here.

Mr. TAWNEY. The statements will be received and included as a part of the evidence of the State, subject to the objection.

Mr. PREUS. In that same connection, and answering your question further, Mr. Commissioner, a map will be introduced in evidence here to show, as nearly as possible, where all of the lands that the State owns lie that are now being flooded. On that map you can locate these lands and it will show that they are right contiguous, most of them, to those lands or very close to them.

(The map referred to was marked "Minnesota Exhibit C.")

Mr. TAWNEY. Mr. Preus, what is the aggregate amount of land that would be submerged at the highest contour line on the map of the consulting engineers? Will you please also state whether the surveys made by the representatives of the State and the consulting engineers with respect to the extent of land submerged has been compared with a view to ascertaining their relative correctness?

Mr. PREUS. That has all been done, Mr. Commissioner. Mr. Berg, who was an engineer for the State auditor's office before I became State auditor, and who is still in the employ of the State auditor, is here and is prepared to testify on all those points. He will be here just as long as you wish to have him.

Mr. TAWNEY. Have you summed up in these surveys the amount of land that would be submerged at any of the different levels?

Mr. PREUS. Yes; that information will be introduced here. I wish to thank you, Mr. Commissioner, for hearing me at this time, as I was very anxious to depart this evening.

Mr. RICHARDSON. I would like to ask you a question or two, Mr. Preus.

Mr. PREUS. I shall be very glad to answer them.



Mr. RICHARDSON. You have no knowledge of your own as to any of the facts set forth in Minnesota Exhibit A, have you?

Mr. HILTON. I object to that as immaterial. Minnesota Exhibit A is admitted in evidence, and the Commissioner has stated the purpose for which it is admitted.

Mr. MIGNAULT. I think it is a fair question, Mr. Hilton.

Mr. TAWNEY. You may answer the question, Mr. Preus. The answer will be received subject to the objection.

Mr. PREUS. May I take the liberty of elaborating a little on that question? The commission asked my office to ascertain as nearly as possible the value of those lands that have been submerged. In conformity therewith an appraisal has been made through the instrumentality of the State auditor's office. The appraisal has been made according to law by three gentlemen, one appointed by the governor, one by the county commissioners, and one by the State auditor. They have made their returns, which are here, sworn to and introduced in evidence. Mr. Richardson desires to know whether or not I made those personally, which, of course, I did not.

Mr. MIGNAULT. I understand that, Mr. Preus. Just state the fact. I understand that you say that this appraisal is an official document?

Mr. PREUS. Yes, sir.

Mr. RICHARDSON. You have, then, no personal knowledge as to the facts attempted to be set out in Minnesota Exhibit B?

Mr. PREUS. My reply to that question is the same as to a former question.

Mr. RICHARDSON. You have been in the State auditor's office since the first of January, 1915, have you not?

Mr. PREUS. Yes, sir.

Mr. RICHARDSON. Before that time you occupied another State office?

Mr. PREUS. Yes, sir.

Mr. RICHARDSON. You have familiarized yourself with the records in the auditor's office in the State of Minnesota?

Mr. PREUS. Somewhat; yes.

Mr. RICHARDSON. You know, do you not, that because of the constitution of the State of Minnesota relative to school lands, and because of the provisions of the statute of Minnesota relative to the sale of State lands, that no appraisal has been filed in the auditor's office since the statute was adopted showing a value of less than \$5 an acre.

Mr. HILTON. I object to that as incompetent, irrelevant, and immaterial.

Mr. TAWNEY. The witness may answer the question subject to the objection.

Mr. PREUS. I assume that is true. Of course, I have not examined every record of appraisal, but I cannot conceive of a condition whereby any report could have been filed giving the value at less than \$5 an acre.

Mr. RICHARDSON. Those appraisals which are filed in the office of the State auditor are ordinarily filed preparatory to sales which are advertised from time to time to be made of State lands by the State auditor or land commissioner.

Mr. PREUS. That is correct.

Mr. RICHARDSON. The terms upon which State lands are sold at those sales are fixed by statute, are they not?

Mr. PREUS. Statute and constitution.

Mr. RICHARDSON. You have referred to two sections of the statute and one section of the constitution in regard to such sales. There are other sections which provide that the State is to sell the lands on time, are there not?

Mr. PREUS. Yes, sir.

Mr. RICHARDSON. And that the purchasers are to pay the State a low rate of interest on deferred payments?

Mr. PREUS. Yes, sir; to answer your question fully. All these lands are sold at public auction to the highest bidder. All the cash that it is necessary for a purchaser to pay is 15 per cent of the purchase price. The balance he may pay at any time he sees fit within 40 years. He is not penalized for paying it at an earlier time than forty years. He pays a rate of interest of four per cent to the State.

Mr. TAWNEY. On the deferred payments?

Mr. PREUS. Yes, sir.

Mr. MIGNAULT. Is there any discount in the case of an immediate payment?

Mr. PREUS. The interest stops then. That is what I meant by saying that there was no penalty for paying the full amount.

Mr. RICHARDSON. In other words, the full purchase price is paid but the interest stops?

Mr. PREUS. Yes; if a purchaser desires to do that.

Mr. CAMPBELL. Are there increments of principal of the remaining 85 per cent payable at different periods?

Mr. PREUS. It is payable whenever the purchaser desires.

Mr. CAMPBELL. It is not a part of the contract that they must do so?

Mr. PREUS. No.

Mr. RICHARDSON. The purchaser assumes no personal obligation upon those sales to pay that debt, does he?

Mr. PREUS. I am not prepared to answer that.

Mr. RICHARDSON. Is that the sole remedy that the State has in case of defaulted payments, to cancel the contract, and resell the land?

Mr. PREUS. That is the same question, and I said I was unprepared to reply.

Mr. RICHARDSON. During the period that you have been State auditor, have you ever enforced any personal obligation?

Mr. PREUS. No.

Mr. RICHARDSON. Are you aware of any personal obligation that has ever been enforced through your office by any of your predecessors?

Mr. PREUS. No.

Mr. RICHARDSON. You mean, then, when you say that you are not prepared to answer the question that you have not considered the law from that standpoint?

Mr. PREUS. Exactly.

Mr. RICHARDSON. You have, I believe, been admitted to the bar yourself?

Mr. PREUS. Yes.



Mr. RICHARDSON. The value of the State lands covered by these certificates which have been introduced in evidence as Exhibits A and B, depends upon whether the land is upland or lowland in part, does it not?

Mr. HILTON. I object to that as incompetent, irrelevant, and immaterial.

Mr. TAWNEY. The witness may answer the question subject to the objection.

Mr. PREUS. Some lowlands are more valuable than uplands, and some uplands are more valuable than other lowlands.

Mr. RICHARDSON. You are speaking of the lands included in these lists, are you not?

Mr. PREUS. No; I am speaking of land generally.

Mr. RICHARDSON. I am asking you about these particular lists. Does that answer apply to them also?

Mr. PREUS. They answer as to all lowlands, more or less.

Mr. RICHARDSON. Have you seen them?

Mr. PREUS. Those that have been entered here. It is flat country, somewhat. Otherwise, with the rise of the water level here that you have had, if they had been very hilly, they could not have been submerged. I can not say that one piece is more valuable than another. It depends on the quality of the soil, and it is possible that the lowest piece of land here listed may be the most valuable.

Mr. RICHARDSON. You are not prepared to answer that?

Mr. PREUS. No.

Mr. RICHARDSON. And that is from lack of personal observation or information on the subject, is it not?

Mr. PREUS. Well, I do not see any other reason that it could be from.

Mr. RICHARDSON. The State acquired these lands from the United States, in so far as they have been acquired?

Mr. PREUS. Yes, sir.

Mr. RICHARDSON. Have they all been patented yet to the State?

Mr. PREUS. I believe all of these that are listed here have been patented. I assume that you are not referring to the entire grant of 1860.

Mr. RICHARDSON. No; I am speaking of the lands included in Exhibits A and B.

Mr. PREUS. I think they have all been patented.

Mr. RICHARDSON. But you are not quite positive about that?

Mr. PREUS. There is a gentleman from my office present who will be able to answer that positively of his own knowledge.

Mr. RICHARDSON. He is to go on the stand, is he?

Mr. PREUS. Yes.

Mr. HILTON. I will put him on for that purpose if you want me to.

Mr. RICHARDSON. The State has never laid out any road through these lands, has it?

Mr. HILTON. That is objected to as incompetent, irrelevant, and immaterial.

Mr. TAWNEY. The witness may answer the question subject to the objection.

Mr. PREUS. I can not answer that.

Mr. RICHARDSON. Do you not know that these lands are located in a remote and sparsely settled portion of the State of Minnesota?

Mr. PREUS. They are not in what you would call a well settled community. There are not many farmers in the immediate vicinity of these, but there are some.

Mr. RICHARDSON. What do you mean by a farmer?

Mr. PREUS. A man who farms.

Mr. RICHARDSON. Do you mean a man who cultivates less than 10 acres of soil?

Mr. HILTON. I make the same objection.

Mr. PREUS. Yes.

Mr. RICHARDSON. Is there any grain raised by these farmers to whom you refer?

Mr. PREUS. Yes.

Mr. RICHARDSON. What kind of grain?

Mr. PREUS. Those grains that grow here in Minnesota generally.

Mr. RICHARDSON. What are they?

Mr. PREUS. Well, corn of this county is not the best; wheat, oats, rye, and barley are raised here.

Mr. RICHARDSON. Will you name one farmer within 15 miles of any piece of land in these State lists, Exhibits A or B, who raises any corn?

Mr. PREUS. I have had no more opportunity to ascertain that than you or any other counsel here; and I do not suppose you could answer that question.

Mr. RICHARDSON. It is true, is it not, that you do not know of your own knowledge that there is a single farm in the neighborhood or vicinity of any of those State lands?

Mr. PREUS. I hold public office, and if I go out too much to visit farmers I am accused of farming the farmer, and, consequently, I have never visited any farmer in this county.

Mr. RICHARDSON. These lands are perfectly inaccessible, are they not—these State lands?

Mr. PREUS. No; they are not. There are no roads to them if that is what you mean.

Mr. RICHARDSON. The only practicable highway by which approach may be had to the lands is through Rainy Lake and Rainy River, is it not?

Mr. SAMUELSON. That is objected to on the ground that it is misleading. The witness has already testified that he knows nothing about it; and, because of that fact, any answer that he might make would appear as misleading upon the record. There are plenty of witnesses here who know how these lands may be reached. There is a room full of men here who work upon these lands and who get to them and from them without using the river.

Mr. TAWNEY. The witness may answer the question subject to the objection.

Mr. PREUS. I have been upon Rainy Lake but once, and I have never visited a farmer in Koochiching County. I think that will show the commission how little I know about the proposition.

Mr. MIGNAULT. I understand that the witness is speaking from the records. That is correct, is it not, Mr. Preus?

Mr. PREUS. Yes.

Mr. TAWNEY. I want to ask a question here in respect to these exhibits, Mr. Preus. I see on examining the exhibits that the value



of the timber on the land is estimated separately from the value of the land at \$5 an acre, for example. That is the value of the land exclusive of the value of the timber?

Mr. PREUS. Yes, sir. The statute requires that we estimate the value separately.

Mr. TAWNEY. It had not been explained for the benefit of the record, and I wanted the record to show that the value per acre here of the land was exclusive of the timber.

Mr. RICHARDSON. The State has what is called a State timber board, has it not?

Mr. PREUS. Yes, sir.

Mr. RICHARDSON. That is comprised of what State officials?

Mr. PREUS. The governor, the attorney general, the State treasurer, the State forester, and the State auditor.

Mr. RICHARDSON. Are you certain that the State forester is a member of that board?

Mr. PREUS. Yes, sir; he is now.

Mr. RICHARDSON. Is that under an amendment?

Mr. PREUS. That is under a recent amendment to the law.

Mr. RICHARDSON. Who decides as to whether lands shall be offered for sale?

Mr. PREUS. Timber lands, do you mean?

Mr. RICHARDSON. The State lands.

Mr. PREUS. I determine that as State auditor.

Mr. RICHARDSON. Does that include land in timber?

Mr. PREUS. The timber on land must be sold separately from the land. When I became State auditor I made a ruling that no timber should be sold with the land if there was more than \$100 worth, estimated, of timber upon a 40-section piece of land. When we sell the timber separately without selling the land, the State timber board that you have just referred to determines whether or not it shall be sold.

Mr. RICHARDSON. In other words, no State land can be sold where timber is valued at more than \$100 until after the timber has been sold?

Mr. PREUS. Oh, yes; it can be, but I did not deem it a matter of good policy for the State, and therefore discontinued a practice which had existed previous to that.

Mr. RICHARDSON. Is it not the law that certain timber lands belonging to the State of Minnesota can not be sold until the timber is first sold?

Mr. HILTON. That is objected to as incompetent, irrelevant, and immaterial, and as having nothing to do with any of the issues here involved.

Mr. TAWNEY. Although the witness may answer the question, I think the objection is perhaps well taken.

Mr. PREUS. I do not know of any such law.

Mr. RICHARDSON. Did these lands included in Exhibits A and B come to the State under what is known as the swamp-land grant, or under the school-land grant, or under both?

Mr. PREUS. If they are in sections 16 and 36 they come under the school-land grant. If they are not in sections 16 and 36 they come under the swamp-land grant, unless there should happen to be

some indemnity school land among them, which I do not suppose there is.

Mr. RICHARDSON. How about university lands?

Mr. PREUS. I do not think there are any university lands among these.

Mr. RICHARDSON. Has the Land Commissioner sometimes transferred other lands to the school lands?

Mr. PREUS. By a ukase?

Mr. RICHARDSON. In any way.

Mr. PREUS. There have been swamp lands, as you know, transferred to the school lands under a constitutional provision, I believe. I can not turn to it now.

Mr. RICHARDSON. Were any of the lands in these lists of that character, or did they go through any such transaction?

Mr. PREUS. To correct the impression which you might have assumed from my statement there—I do not believe any lands are transferred as property of one fund from another, but the receipts therefrom are; I think that is the way the provision reads.

Mr. RICHARDSON. Now, in these lists which you have caused to be prepared, Exhibits A and B, you have a column which contains sometimes the word "school" after the description and sometimes the word "swamp" after the description—is that merely an indication of the fund to which the proceeds go?

Mr. PREUS. Will you show me where that occurs in these lists?

Mr. RICHARDSON. The place where that column is found is in Exhibit C instead of in Exhibits A or B. Is that correct?

Mr. PREUS. Yes; I think that is correct.

Mr. RICHARDSON. Then neither Exhibit A nor Exhibit B shows which lands belong to the school lands or which belong to the swamp lands.

Mr. PREUS. An earlier answer to a question by you would indicate that.

Mr. RICHARDSON. Can any school lands be sold under the State law without first selling the merchantable pine timber thereon?

Mr. PREUS. Yes, sir.

Mr. RICHARDSON. Is there any limitation to that answer?

Mr. PREUS. Not that I know of.

Mr. RICHARDSON. Then, regardless of how much pine timber there may be on a piece of State land, you say that the State authorities can sell that land without first disposing of the pine timber, do you?

Mr. HILTON. He did not say any such thing.

Mr. TAWNEY. May I ask what the purpose of this line of cross-examination is, Mr. Richardson?

Mr. RICHARDSON. I think it has to do with values.

Mr. TAWNEY. You may proceed. I do not quite see the relevancy of the question to values, whether it is school land or State land.

Mr. RICHARDSON. Swamp land, I think the commissioner means. The provisions are somewhat different as to the two classes.

Mr. TAWNEY. Affecting their value?

Mr. RICHARDSON. I think they affect the value; that is, if the commission proceeds along the line of market value at any particular time. I take it that the question of market value may become material to the commissioners in connection with their report.



Mr. TAWNEY. Whether it is State land or school land, the commission would have to simply report. We are not required under the reference to differentiate between the character of the ownership of the land at all. In other words, whether it is school land or State land is not at all material.

Mr. ROCKWOOD. Mr. Commissioner, the point in my mind is that the fact that it comes under the swamp-land grant shows of itself that it is swamp land. Its prevailing character might be dry spots, but it shows the character as swamp land.

Mr. TAWNEY. The actual fact, however, would be manifest here, both by the report of our consulting engineers and by the reports now submitted to the commission by the State, as to whether it is swamp land or open bog.

Mr. ROCKWOOD. That is true in part, but I think there are some lands here that are outside any of those contour lines, especially in Exhibit C.

Mr. TAWNEY. If they are outside of the contour lines, we would not give them any consideration whatever. If they are outside of the contour lines they would not be affected by any level that the commission might recommend, and, therefore, we would be going entirely outside of the reference to include them. But the report of the consulting engineers shows the character of all the land between the various contour lines, and so does the report of the appraisers. The report of the consulting engineers goes into very minute detail in regard to the character of the timber that is on the land, and it does not seem worth while to take up time on this question of whether they are swamp lands or not, because the surveys of the employees of the commission, and also the testimony of the men who have made the State surveys, would indicate what the character of the land is, independent of whether it is under one grant or another grant.

Mr. PREUS. May I add this to the record: The fact that lands are termed swamp lands under the grant of 1860 from Congress does not in any sense of the word mean that they are actually swamp lands.

Mr. RICHARDSON. How do you know that if you have not seen them?

Mr. TAWNEY. Just one moment, Mr. Richardson. I might add that that is one reason why the Federal Government is trying to avoid the transfer of a great deal of land to the State that was originally included in the swamp-land grant, on the ground that it is not swamp land.

Mr. HILTON. I have been looking at some of this swamp land litigation, and under the rule that has been adopted by the Department of the Interior, which in a way has been prejudicial to the State, they say that in the adjustment of any grant there will be mistakes made, and the State will get as swamp land that which is not swamp, while, on the other hand, it will lose land that is in fact swamp that it should have; and so, Mr. Preus says, the mere calling it such because it is in the swamp-land grant may or may not signify that it is swamp.

Mr. PREUS. It is, of course, common notoriety that the word "swamp" in connection with swamp-land grants does not mean that the land is swampy in character.

Mr. MIGNAULT. In other words, it is not descriptive of the character of the land?

Mr. PREUS. No; it is not.

Mr. TAWNEY. It is now claimed by the Interior Department that the original surveys were made at a time when there was a good deal of rain up here, and the field notes are what control, and the field notes show what is swampy and what is not swampy. That is what controls in the transfer.

Mr. PREUS. The original field notes.

Mr. HILTON. In several reservations on the lakes, the secretary ordered a reexamination in the field on account of that controversy, and they are supposed to take the result of the examination.

Mr. TAWNEY. That is why I say that the commission will have to be governed largely by the report of the consulting engineers, whose report is based largely upon facts ascertained on the ground.

Mr. RICHARDSON. Mr. Preus, who gave the instructions to the men whom you say signed these appraisals, Exhibits A and B?

Mr. PREUS. I did.

Mr. RICHARDSON. You did not instruct them to appraise that portion of each tract which lay below any certain contour elevation line, did you?

Mr. PREUS. I gave them the ordinary instructions under the law for the appraisement of these lands. As to the effect of the raising or lowering of the level of the lake, that matter was, of course, left to the engineer, and he is here to testify.

Mr. RICHARDSON. Would you mind if I had the reporter read my question to you again, and would you kindly answer it a little more definitely?

(The last preceding question was thereupon read to the witness.)

Mr. PREUS. Do you mean separately, Mr. Richardson?

Mr. RICHARDSON. Separately.

Mr. PREUS. Do you mean thereby that a line should be drawn to show each contour over every 40-acre tract that is appraised and then have that portion appraised at the various contours?

Mr. TAWNEY. I understand Mr. Richardson to inquire as to whether you instructed them to appraise the lands below the lowest contour as shown on the map.

Mr. RICHARDSON. I mean below any contour.

Mr. PREUS. The instructions that I gave to these appraisers were exactly the same instructions that I gave to all appraisers of land.

Mr. RICHARDSON. On general appraisements for purposes of sale?

Mr. PREUS. Yes.

Mr. RICHARDSON. That is, they were to go and appraise each 40-acre tract as a whole?

Mr. PREUS. Yes, sir.

Mr. RICHARDSON. Without reference to whether a portion of it was above a certain contour line or whether it was below? I mean by a 40-acre tract, either the full 40 or the Government lot which corresponds to the 40.

Mr. PREUS. Yes; with that elaboration I answer it in the affirmative.

Mr. RICHARDSON. You gave none?

Mr. PREUS. No.

Mr. CAMPBELL. Did you give your appraisers instructions that \$5 per acre was the minimum?

Mr. PREUS. Yes, sir.



Mr. CAMPBELL. Because the statutes prescribe \$5 as the minimum price?

Mr. PREUS. Yes, sir.

Mr. TAWNEY. Mr. Preus, these sheets show the number of acres that are now flooded or submerged at the level of the lake at the time of the survey?

Mr. PREUS. Yes, sir.

Mr. RICHARDSON. Who arrived at that acreage?

Mr. PREUS. The appraisers.

Mr. RICHARDSON. Did they have an engineer?

Mr. PREUS. Yes, sir.

Mr. RICHARDSON. Who was the engineer?

Mr. PREUS. Mr. Berg.

Mr. RICHARDSON. What are his initials?

Mr. PREUS. L. S. Berg, who is here and who will go on the stand.

Mr. RICHARDSON. When did your office first employ him?

Mr. PREUS. I can not say that; I do not know.

Mr. RICHARDSON. Did you not employ him because he had been engaged by a certain number of settlers in Koochiching County in the vicinity of Rainy Lake?

Mr. PREUS. I do not know that. I was not State auditor when he was first employed.

Mr. RICHARDSON. Was he employed through the attorney general's office?

Mr. PREUS. I do not know that.

Mr. RICHARDSON. Does not the State have in its employ competent engineers?

Mr. PREUS. All the engineers that the State has are no doubt competent for their specific work, but I do not know any engineer on whom the attorney general or my office could make requisition and require him to do this work.

Mr. CAMPBELL. Mr. Kluttz's letter was written on the 18th of September and should have reached you in St. Paul a couple of days later. When did the appraisers begin their work—when did they get on the ground?

Mr. PREUS. I can not recall that from memory.

Mr. CAMPBELL. Do you remember how long it took to get the board—the three of them—constituted and sworn in and qualified?

Mr. PREUS. I can not recall just how long it took.

Mr. CAMPBELL. When did they leave the field?

Mr. PREUS. Very recently.

Mr. CAMPBELL. Within how close to the present time?

Mr. PREUS. I think their final statement was made on the 19th of this month.

Mr. RICHARDSON. Do the copies that you have submitted to the commission contain the names of those appraisers?

Mr. PREUS. Mr. Hilton made a statement in regard to that, I believe.

Mr. HILTON. No; I do not think they contain the names of the appraisers.

Mr. RICHARDSON. Is it not a fact that three men did not appraise each tract, that is, the same three men?

Mr. PREUS. There was a change of appraisers. There were three men appraising each tract; but there was a change of representative

from the governor's office; and I would just as soon have it read into the record, too, that that made some of the work extremely difficult to furnish, because of the fact that Gov. Hammond died within a few days after the original appraiser appointed by him had resigned, and we had to have another man appointed by his successor before we could resume the work.

Mr. RICHARDSON. Do you mean that aside from that occurrence the same three men appraised all lands except those that were appraised by the man that Gov. Burnquist appointed?

Mr. PREUS. No; I think there was one other at least, if not two.

Mr. RICHARDSON. You have not in mind the names of the men who you claim made the appraisalment, have you?

Mr. PREUS. No; I have not them in mind.

Mr. TAWNEY. Mr. Rahn, who represents the Shevlin-Clark interest on the other side, desires to make a request of the committee, and there is no objection to it.

Mr. RAHN. Although we should have known of this hearing, we did not hear of it till yesterday, but the trend of the testimony here shows that we are interested in the level maintained at Fort Frances, and we desire, with the permission of this commission, to file the brief of our engineers in regard to that.

Mr. TAWNEY. In regard to the effect on your property on the other side?

Mr. RAHN. In regard to the effect it will have on the mill property of the Shevlin-Clark Co. (Ltd.), at Fort Frances. I am not a technical man, nor an engineer, but so far any level maintained above 497 would affect our property, and for that reason I desire to file a brief from our engineers in regard to that.

Mr. TAWNEY. There is no objection to that. I may say that the statement of your engineers which you ask permission to file should be filed within about three weeks.

Mr. RAHN. Yes; it will be mailed to the commissioners in Canada and the United States.

Mr. TAWNEY. Mail it to the secretary of the International Joint Commission at Ottawa, and the secretary of the International Joint Commission at Washington; also send a copy to Mr. Rockwood.

Mr. RAHN. Mr. Rockwood has just arranged for that.

Mr. RICHARDSON. And the length of time Mr. Rockwood would have to reply.

Mr. TAWNEY. He would probably have three weeks more.

### TESTIMONY OF MR. BERG.

L. A. BERG, having been duly sworn, testified as follows:

Mr. HILTON. Where do you live?

Mr. BERG. Duluth.

Mr. HILTON. How old are you?

Mr. BERG. Fifty-three next summer.

Mr. HILTON. What is your business?

Mr. BERG. Surveyor.

Mr. HILTON. How long have you been engaged in that business?

Mr. BERG. About 25 years.

Mr. HILTON. What have you been employed at?



Mr. BERG. I have been county surveyor in Hubbard County; I worked for T. H. Walker, as engineer, surveyor, and all-round man, and worked for the Department of the Interior at Cache Lake, and then came and worked for different companies like Scott and Cross, and other companies.

Mr. HILTON. Are you familiar with the State lands that will be injuriously affected by the rising of the waters in Rainy Lake, Rainy River, Rat Root Lake, and Black Bay, and the several streams or lakes that are the subject of this investigation, if the levels in those lakes are raised above their natural or normal level?

Mr. RICHARDSON. Objected to as assuming something that has not been shown, and as indefinite and uncertain, because what counsel may mean as to normal or natural level the witness may not understand or mean.

Mr. HILTON. I am using the language of the Governments in this reference, and if that is indefinite and uncertain, I do not know.

Mr. TAWNEY. I suppose it is also asked in the light of the testimony given at International Falls last September by the consulting engineer, and as also shown by the report as to what the normal or natural level on those lakes was in a state of nature; that is what you have reference to?

Mr. HILTON. Yes, and also as I develop it by the testimony of this witness.

Mr. MIGNAULT. I suppose Mr. Richardson can ask the witness what he considers to be the normal and natural level.

Mr. TAWNEY. I should like to have some information as to the land above the ordinary high water of this lake.

Mr. HILTON. We will have that.

(Question read to witness.)

Mr. TAWNEY. Can you answer that?

Mr. BERG. I was up there when there was high-water——

Mr. HILTON. I asked you if you were familiar with those lands, if you knew where the State lands were?

Mr. BERG. Yes.

Mr. HILTON. I show you Minnesota Exhibit D, and ask what that is?

Mr. BERG. This shows the country around on the south shore of Rainy Lake.

Mr. TAWNEY. Is it a map?

Mr. BERG. Yes, showing the south shore of Rainy Lake and Rat Root Lake, and Black Bay and Rat Root River; it is two inches to the mile.

Mr. HILTON. I may state that in the examination of Mr. Preus it was indicated that it would be the desire of this committee to have something showing the relative position of the lands that had been sold and are described in Minnesota Exhibit C, and for the purpose of complying with that request, I am introducing this testimony. Is this a correct designation, as shown by the Government field notes and plats of the land that is purported to be delineated upon the map?

Mr. BERG. It is a copy of the Government plat on file in the Land Office, so far as topographical descriptions are concerned.

Mr. HILTON. Are there designated upon Minnesota Exhibit D, and if so, in what way, the various State lands that will be affected?

Mr. BERG. The State lands that will be affected are marked in dark green color. I would add to this, to make it understood, that we always call it a forty subdivision, or a fraction of a lot.

Mr. MIGNAULT. Does your plan show elevations?

Mr. BERG. Our plan does not show elevations. We had them, and I have here the number of elevations I computed out of those elevations. We made the survey where the water actually was. We did not have it based on a bench mark, because the highest watermark, wherever we had found it, and taken for our base, I went up and compared it, and I found that it would nearly compare with level 498.

Mr. TAWNEY. With what did you make the comparison?

Mr. BERG. With some marks I had there. I had some bench marks there, and I compared with the marks, and I got the readings down here in Fort Frances. I could get them on the ice.

Mr. HILTON. I offer Minnesota Exhibit D in evidence. I may say that this map is for the purpose of giving a general view of the country.

Mr. TAWNEY. Of the location of the State lands?

Mr. HILTON. Yes; that is the only purpose.

Mr. MIGNAULT. Has it been compared with the maps prepared by the consulting engineers of the commission?

Mr. BERG. It has not.

Mr. HILTON. Minnesota Exhibit E is what?

Mr. BERG. The lands affected by Kettle Falls Dam.

Mr. MIGNAULT. It shows no elevations, does it?

Mr. BERG. No.

Mr. HILTON. It is made the same way as D?

Mr. BERG. Yes.

Mr. HILTON. And does it show correctly the relative location of the lands indicated upon the exhibit and the lakes and rivers shown on the map?

Mr. BERG. It is a copy of the Government plats, so far as the topography is concerned.

Mr. HILTON. How are the lands of the State that will be injuriously affected by the change in level over and above the normal level indicated on this Exhibit E?

Mr. BERG. There are lots shown on this map that might be affected in a way that they might be able to be drained.

Mr. HILTON. The lands indicated upon those two Exhibits Minnesota D and Minnesota E in darker green are State lands?

Mr. BERG. Yes.

Mr. HILTON. I offer those two exhibits in evidence.

Mr. TAWNEY. They will be received.

Mr. HILTON. Have you gone over and examined the lands indicated upon Minnesota Exhibit D and Minnesota Exhibit E, and the lands that are described and set forth in Minnesota Exhibits A and B, being the appraised lands?

Mr. BERG. Yes; I have. I do not know that I have been over all of it; I was not east of range 20. If there are any in here east of range 20 I have not seen them.

Mr. HILTON. Have you made a survey of the State lands indicated on the maps Minnesota Exhibits D and E?

Mr. BERG. Yes.



Mr. HILTON. For the purpose of ascertaining the amount of such lands that would be injuriously affected by the raising of the water up to the different contour lines?

Mr. BERG. Yes; I have to modify that answer. I have it up to level 498, between 498 and 499. I had to compute from the engineers' plat, and from 499 to 500 it is computed with the help of the engineers' plat. That is all I have; 498 is my own survey.

Mr. HILTON. When you speak of the engineer, you mean the consulting engineer of the American Government?

Mr. TAWNEY. For the commission. Did you make the 497 contour?

Mr. BERG. I did not. That was under water at the time I was on.

Mr. TAWNEY. Then there is no computation of the amount of land between 497 and 498?

Mr. BERG. No; I have 498, 499, and 500, and the 501 I did not want to give; it was too far away from where I had been, and the engineers' survey would be just as good as mine.

Mr. HILTON. You made your own survey from what level up to what level?

Mr. BERG. We took the Government meander lines up to the level of 498 and to the lower mark the Government meander line.

Mr. HILTON. And the computation you made as to the lands that would be flooded up to 498 was made from the Government meander lines, the level of that line, up to 498?

Mr. BERG. Up to the contour line of 498.

Mr. HILTON. And as to where the contour would be at 499, you took the engineers' plat?

Mr. BERG. Yes.

Mr. HILTON. And the same is true going up as far as you went?

Mr. BERG. Yes.

Mr. HILTON. This has reference, I understand, to Minnesota Exhibit D?

Mr. BERG. No; the level is different there.

Mr. HILTON. What exhibit of Minnesota D or E do these levels apply to?

Mr. BERG. To D.

Mr. HILTON. You may tell what you did relative to the lands and waters shown on Minnesota Exhibit E. Tell us how you computed the acreage of the lands affected shown on Minnesota Exhibit E.

Mr. BERG. In the survey we made there, I compared my bench marks and those I found there—I found Government bench marks just established by the engineers of the commission, and I compared mine with them, and as near the inside of a fraction of tenths of feet my level would be about 509, less 510; I compared those with the 510 level of the engineers' plat and computed the 510 level, based partly on mine and partly on his, and the 515 level is computed entirely from the commission engineers' plat there. There is the 510 and 515 contour.

Mr. HILTON. Have you computed for the purposes of the commission the number of acres of land that would be submerged between the different levels that you have testified to?

Mr. TAWNEY. Take first, in order to avoid confusing the computation of land, between 498 and 500, as shown on D, and then take the other one.

Mr. HILTON. He has prepared a tabulated statement that shows this.

Mr. BERG. They are shown on separate sheets.

Mr. HILTON. I show you Minnesota Exhibit F and ask you what it is.

Mr. BERG. It shows the number of acres flooded by level 498 and also 499 and also 500; it gives the total under each head; then it gives the value per acre as I took them from those sheets.

Mr. HILTON. Referring to Minnesota Exhibits A and B?

Mr. BERG. Yes; I put them in from those sheets, and it shows by each section the township and range; I have got no smaller subdivision than a section.

Mr. HILTON. That is on this plat?

Mr. BERG. Yes; on this tabulated form. Then there is another one with it, on the other side, which shows the land that might be affected by not being able to be drained, also by section on this, and the value is also taken by the appraisers.

Mr. MIGNAULT. That is the second sheet of F?

Mr. BERG. Yes.

Mr. HILTON. I understand you to say that Minnesota F shows the number of acres of land flooded or that would be flooded by the raising of the water to the various levels indicated?

Mr. BERG. Yes.

Mr. HILTON. Per section?

Mr. BERG. Yes.

Mr. HILTON. And that in fixing the value of these lands you have taken the valuation placed by the appraisers in Minnesota Exhibit A or B, as the case may be, and from that multiplication derived your total?

Mr. BERG. Yes, sir.

Mr. HILTON. Who prepared this?

Mr. BERG. I did. I did not typewrite it, but I prepared it.

Mr. HILTON. And the computations were made by you?

Mr. BERG. Yes.

Mr. HILTON. We offer in evidence Minnesota F.

Mr. BERG. I would like to make a correction.

Mr. TAWNEY. That will be received.

Mr. BERG. Just to make my statement right—No. 1, marked as plate Nos. 1, 2, 3, 4, 5, and 6—

Mr. TAWNEY. On Minnesota Exhibit F?

Mr. BERG. Yes; these are not on the engineers' plat; I guess it is the international boundary survey, so that it may be confusing.

Mr. HILTON. Looking at Minnesota Exhibit G, tell me what it is.

Mr. BERG. It gives the land that would be submerged by level 510 and by level 515 also; it gives a statement of the lands that would be damaged by not being able to drain if the level was raised to 510, and also a statement if the level was raised to 515 conditionally.

Mr. TAWNEY. The land referred to being the land as shown on Minnesota Exhibit E?

Mr. BERG. Yes.

Mr. HILTON. And described in Minnesota B, I think.

Mr. TAWNEY. I want to identify it in connection with this map; that is all.



Mr. TAWNEY. Did you follow the same procedure in the preparation of Minnesota G as you have testified to in regard to Minnesota F?

Mr. BERG. Just as I have said. My level was 499, and I had to go on the engineers' plat in order to get the level.

Mr. TAWNEY. On Minnesota G you show the number of acres that would be flooded at the various levels indicated and have used the appraised price per acre?

Mr. BERG. Yes.

Mr. TAWNEY. And in your total you have arrived at it by multiplying the number of acres flooded by the price per acre fixed as the price by the appraisers?

Mr. BERG. Yes; I would like to add that the number of acres under each level are given full to the level; the number of acres given by not being able to be drained is additional to the other, and the plat so indicates; that would be additional.

Mr. HILTON. Minnesota Exhibit G is offered in evidence.

Mr. TAWNEY. The exhibit is received.

Mr. RICHARDSON. You say you were county surveyor of Hubbard County?

Mr. BERG. I say I was.

Mr. RICHARDSON. Why did you leave that office?

Mr. HILTON. Objected to as incompetent, irrelevant, and immaterial. I do not know whether it has any bearing on the controversy or what the answer may be.

Mr. TAWNEY. His answer will be received subject to the objection, but I suppose that counsel should avoid taking up time on these matters.

Mr. BERG. I did not file my name for reelection, and I was not reelected, and I was left off.

Mr. RICHARDSON. And that is all there was to it?

Mr. BERG. Yes.

Mr. RICHARDSON. Your recollection is good about it?

Mr. BERG. Well, do you know anything better?

Mr. RICHARDSON. You state that Exhibits D and E were copies of the Government plat, do you?

Mr. BERG. Yes.

Mr. RICHARDSON. In the land office, you say?

Mr. BERG. Yes.

Mr. RICHARDSON. What land office?

Mr. BERG. Duluth; except that little part that is added on, of range 24, which is not in the Duluth land office.

Mr. RICHARDSON. Where did you get that part?

Mr. BERG. I got it from the lithographer.

Mr. RICHARDSON. From a lithographed plan?

Mr. BERG. From the lithographed plat, which is a photograph of the Government plat, and the lithographed plat.

Mr. RICHARDSON. You do not mean that you took this plat, Exhibit D, from a plat of the same size?

Mr. BERG. No; township plat.

Mr. RICHARDSON. You mean that you took some township plats and put them together and compiled this large plat?

Mr. BERG. Yes.

Mr. RICHARDSON. And the same is true of Exhibit E?

Mr. BERG. Yes.

Mr. RICHARDSON. Some of those Government plats you say you found in the Duluth land office?

Mr. BERG. Yes.

Mr. RICHARDSON. They related only to land in St. Louis County?

Mr. BERG. No.

Mr. RICHARDSON. How far west did they extend?

Mr. BERG. The townships in Koochiching County—ranges 22 and 23.

Mr. RICHARDSON. Where did you get them?

Mr. BERG. In Duluth.

Mr. RICHARDSON. From what plat?

Mr. BERG. From the plat of the town.

Mr. RICHARDSON. Where did you get the piece that you pieced on?

Mr. BERG. Twenty-four?

Mr. RICHARDSON. Yes.

Mr. BERG. Well, I had those 6-inch plats—what we call 6-inch Government plats—as we buy them and use them.

Mr. RICHARDSON. You mean they were 6-inch photographic reproductions of—

Mr. BERG. Of the Government plat.

Mr. RICHARDSON. Made by somebody of the name of Jewett?

Mr. BERG. Jewett and son.

Mr. RICHARDSON. Those, then, were not taken directly by you from Government plats?

Mr. BERG. No.

Mr. RICHARDSON. Did you not take them all from Jewett plats?

Mr. BERG. No.

Mr. RICHARDSON. Why not?

Mr. BERG. Because I wanted a larger plat; it was easier for me to copy them.

Mr. RICHARDSON. Did you make the copies yourself?

Mr. BERG. Yes.

Mr. RICHARDSON. When did you begin to make the copies?

Mr. BERG. It is a long while ago.

Mr. RICHARDSON. What year?

Mr. BERG. 1914.

Mr. RICHARDSON. When did you complete them?

Mr. BERG. In 1914.

Mr. SAMUELSON. I do not like to object, but there are a large number of settlers here who are staying here at their own expense, and this cross-examination on irrelevant matters simply takes up time, and could some ruling be made by the commission so that so much time would not be taken up keeping these people away from their homes? They are here at their own expense.

Mr. TAWNEY. I will say that, personally, I have indicated several times that what the committee desires is material evidence bearing upon the question of the extent and value of the lands that are affected by various levels of Rainy Lake, and I appreciate the fact that counsel is pursuing, perhaps, a legitimate line of cross-examination and I leave it as largely as possible to his judgment to assist in economizing time as far as possible. I will say now that we will



have an evening session, so as to get through with as much testimony as possible, and conclude the inquiry to-morrow.

Mr. SAMUELSON. The cross-examination has looked so irrelevant to me that I do not see where any great amount of benefit could be derived.

Mr. MIGNAULT. I hardly look on it as irrelevant as cross-examination, but I would ask Mr. Richardson if it is very material, because our engineers have furnished plans, and we will refer to them.

Mr. RICHARDSON. I will make it as brief as possible.

Mr. TAWNEY. Our plats will govern the judgment of the commission as to the extent of the land involved, and will show conclusively as to the extent of lands that will be involved between certain contours; and, of course, as to the land affected, the State virtually agrees to the conclusion of the consulting engineers of the commission with respect to the extent of it. So that element might be eliminated to a very great extent now, unless there are others interested who disagree with the findings or with the report of the consulting engineers; and if so, why, of course, you can proceed to question the correctness and accuracy of the survey made by the consulting engineers and present such testimony as you have to show that the land is not as indicated on our maps.

Mr. RICHARDSON. I presume this is presented by the State to contradict the engineers of the commission.

Mr. TAWNEY. No. You may not understand the evidence of the witness as I understand it. He says that he had gone over carefully the maps prepared by the consulting engineers, or compared them with the results, as shown by his maps, and that they are substantially the same between the same contours. There is only one difference, that he starts with Minnesota Exhibit E. or D, with 498, whereas the contour shown on our maps, or maps of our consulting engineers, begins with 497; so that he has no estimate as to the amount between 497 and 498, but between 498 and 499 and 500 he has an estimate; so that the amount of land is practically agreed on by the engineers of the State. I do not know whether there are other interests that question the correctness of the engineers' maps or not.

Mr. HILTON. There are, as I understand it, some differences between the acreage, as determined by Mr. Berg and by the consulting engineers, but the difference is not great, and I will have Mr. Berg explain that later on if desired, and also, if he has not already done so, as to how he computed the acreage between the 498 level that he took; but we are not introducing this as contradicting anybody or anything. We were requested to come here and show the acreage we claim was flooded or damaged.

Mr. RICHARDSON. You know John E. Samuelson, who has just made some remarks for the record?

Mr. BERG. I do.

Mr. RICHARDSON. He hired you in connection with making a survey for some of the settlers in Koochiching County?

Mr. BERG. Yes.

Mr. RICHARDSON. In relation to lands claimed by him to have been overflowed by Rainy River, did he not?

Mr. BERG. Yes; he did.

Mr. RICHARDSON. And he employed you first in 1914, did he not, about that?

Mr. BERG. I believe when he employed me it was late in December, 1913.

Mr. RICHARDSON. And in a suit pending in the district court for Koochiching County, Minn., you went on the stand and testified, did you not?

Mr. BERG. I did.

Mr. RICHARDSON. In regard to water flowage and damage from Rainy River, Algot Erickson being the plaintiff and the Minnesota and Ontario Power Co. being the defendant?

Mr. BERG. I did not testify as to damage; I testified as to the height of water and the extent of the overflow.

Mr. RICHARDSON. You made an arrangement through Mr. Samuelson with a number of settlers in the Rainy Lake district at the same time?

Mr. MIGNAULT. Really, what difference does it make? Unless you expect to impeach plans, the only point on which he has been examined is as to the statement, and the fact that he was employed by some private parties does not impeach his testimony, so far as I can see. Perhaps you can enlighten me.

Mr. RICHARDSON. I was going to follow it with one question which will bring out what I was endeavoring to arrive at—and you undertook that work on a contingent basis, did you not?

Mr. BERG. I did not.

Mr. RICHARDSON. And that was before you undertook the work for the State?

Mr. BERG. Yes, sir.

Mr. RICHARDSON. Who assisted you in making your examination and surveys of each acre tract?

Mr. BERG. I think there was perhaps a crew of 14; I could not say exactly; it was two years ago.

Mr. TAWNEY. A crew of 14?

Mr. BERG. Yes; I can not remember.

Mr. TAWNEY. Were they employed by the State?

Mr. BERG. Yes.

Mr. TAWNEY. You were also employed by the State?

Mr. BERG. I was also employed by the State.

Mr. RICHARDSON. What part of the work did you do personally?

Mr. BERG. I went practically over the whole of it personally.

Mr. RICHARDSON. What do you mean by practically over the whole of it?

Mr. BERG. So far as I could go where the water was not.

Mr. RICHARDSON. When did you begin on the State lands?

Mr. BERG. The first time I went up was in May; then we went up again in July, and then we were up there in October.

Mr. RICHARDSON. How long did you work on the May trip?

Mr. BERG. About 15 days—10 or 15 days; I could not tell exactly; it was merely a reconnoissance.

Mr. RICHARDSON. You did no work on that trip?

Mr. BERG. A reconnoissance trip.

Mr. RICHARDSON. The next one?

Mr. BERG. It must have been in July.

Mr. RICHARDSON. How long did you spend then?



Mr. BERG. It might have about six or seven weeks.

Mr. RICHARDSON. You know; we do not.

Mr. BERG. Well, I don't, either; I have not the records here.

Mr. RICHARDSON. When were you there next?

Mr. BERG. In October.

Mr. RICHARDSON. How long did you stay then?

Mr. BERG. We went about the middle of October and came out the first part of November, 1914.

Mr. RICHARDSON. When did you go again?

Mr. BERG. I went again last winter.

Mr. RICHARDSON. The winter of 1914-1915?

Mr. BERG. No; 1915-1916.

Mr. RICHARDSON. You mean this winter, but I was merely there to compare my levels with the Government levels.

Mr. RICHARDSON. How long did you spend then?

Mr. BERG. I guess it was about six days; I had to make quite a tour round.

Mr. RICHARDSON. Have you the books which you kept and in which you put your figures and from which you computed your table, Exhibit F?

Mr. BERG. I have the plats; yes, I have the books.

Mr. RICHARDSON. And are the books here?

Mr. BERG. No, they are not; I did not bring the books; I think it was scattered in different books.

Mr. RICHARDSON. The correctness of this Exhibit F depends entirely upon the work in those books, does it not?

Mr. BERG. Well, sure; not only this, but it depends on the correctness of the work on the ground and the work of the International Boundary Survey.

Mr. RICHARDSON. Then Exhibit F is merely a compilation?

Mr. BERG. Yes.

Mr. RICHARDSON. Of some computation?

Mr. BERG. I do not claim that it is positively right to half or a quarter of an acre, I do not claim it; I can not. I have been telling you what it is based on. I would not take the responsibility to say it is just to an acre.

Mr. RICHARDSON. You do not claim it is correct?

Mr. BERG. I claim it is nearly correct.

Mr. MIGNAULT. Substantially correct?

Mr. BERG. Yes.

Mr. RICHARDSON. Who made the computations?

Mr. BERG. I did.

Mr. RICHARDSON. Can you give us the figures that you used in getting at what you claim were the number of acres flooded, as set down in this table in section 12, township 70, range 22?

Mr. BERG. No; not in any order. I have not got that here; I brought the tables as I have made them—that is all I did bring.

Mr. RICHARDSON. And it is impossible for you to reproduce here any of the computations by which you arrived at these results?

Mr. BERG. Not now.

Mr. RICHARDSON. You can not do it?

Mr. BERG. No.

Mr. RICHARDSON. Now, with regard to the second sheet of Exhibit F—what do you say that represents?

Mr. BERG. It is claimed it might be damaged by not being able to drain.

Mr. RICHARDSON. That land included in what contour lines?

Mr. BERG. There are no contour lines there on that; there may be a foot; it might be fixed to a particular level.

Mr. RICHARDSON. What particular level?

Mr. BERG. If the level 498 is taken, 499 may come under that class; and if the level 400 were taken, 500 would come under that. That is based on the 499 level.

Mr. MIGNAULT. I would like to know how he determines the levels; he has referred to figures.

Mr. RICHARDSON. Will you explain that?

Mr. BERG. We had the actual high water there when we made the levels.

Mr. MIGNAULT. How did you determine when it was at level 499?

Mr. BERG. I compared the water with my bench mark, and I came pretty near, and got the reading there. I got what the reading would be in Fort Frances; that is the way I got it on Rainy River.

Mr. MIGNAULT. What bench mark did you use?

Mr. BERG. I did not use any bench mark; I used the ice. The water was practically one level. There was no bench mark I could get.

Mr. MIGNAULT. How did you ascertain the level was at 499?

Mr. BERG. That is the level I got that particular day. It was 499.3. I do not say it was quite 498; it was a little less, and I was six-tenths higher than it was there.

Mr. MIGNAULT. On that particular day?

Mr. BERG. Yes; I took it that same day.

Mr. RICHARDSON. When was that?

Mr. BERG. I would not be sure, but I think it was some time about the 15th or 16th December, or somewhere there.

Mr. RICHARDSON. What do you mean by somewhere there?

Mr. BERG. Inside of a few days.

Mr. RICHARDSON. What do you mean by a few days?

Mr. BERG. I mean a few days.

Mr. RICHARDSON. Do you mean within three or four days?

Mr. BERG. Three or four days.

Mr. RICHARDSON. Three or four days of December 15?

Mr. BERG. Yes.

Mr. RICHARDSON. What gauge reading did you take?

Mr. BERG. I took it from the recorder; he gave me the gauge reading there.

Mr. RICHARDSON. Who was the recorder you took it from?

Mr. BERG. In Ranier.

Mr. RICHARDSON. What was his name?

Mr. BERG. I do not know. He gave it to me in writing; I do not know the name.

Mr. RICHARDSON. What were the figures you got?

Mr. TAWNEY. 497.3.

Mr. BERG. No; I have to explain that. The reading was 95 something; I do not understand that; it would be, according to the bench mark, 500. I took that and sent it to the resident engineer in Ranier and asked him to give me what it would be according to the bench mark, 500.

Mr. RICHARDSON. You had some correspondence with somebody?



Mr. BERG. Yes; the resident engineer.

Mr. RICHARDSON. What was his name?

Mr. BERG. I do not know.

Mr. RICHARDSON. You assumed this information you got was correct and you worked from that?

Mr. BERG. Yes.

Mr. RICHARDSON. You do not know about the figures?

Mr. BERG. No; I do not know exactly, but that is the way I arrived at that 498.

Mr. RICHARDSON. Now, with regard to the computations that you have made on Exhibit F, what particular contours or elevation lines did you use in connection with that?

Mr. BERG. About 509; you mean the Kabetogama drain?

Mr. RICHARDSON. No; I mean the second ditch on F?

Mr. BERG. There is nothing particular: any land that would be two or three feet higher.

Mr. RICHARDSON. Higher than what?

Mr. BERG. Higher than the particular level 498 would be injured by not being able to drain. I would not take the responsibility to an exact acre.

Mr. RICHARDSON. Do you mean that is substantially correct?

Mr. BERG. Substantially correct.

Mr. RICHARDSON. Sheet 2?

Mr. BERG. Sheet 2.

Mr. RICHARDSON. On an extra 2 feet above 498?

Mr. BERG. Well, it might be 3 feet in places; it depends how far back it might be.

Mr. RICHARDSON. You have not anything to show us as to how far back you went?

Mr. BERG. Well, where I did it, yes, I had.

Mr. RICHARDSON. But you have not got it here?

Mr. BERG. No, I have not.

Mr. RICHARDSON. You got at your computations and figures which you show on Exhibit G the same way, did you not?

Mr. BERG. In the same way.

Mr. CAMPBELL. There is a matter I want a little explanation on: what is the general slope of the lands above Rainy Lake district and the other waters on this sheet D; about how much do they rise to the mile, leaving the——

Mr. BERG. That is not the same in all places.

Mr. CAMPBELL. Can you give me some ranges or limits?

Mr. BERG. Some places it rises considerably, and other places, where it is low ground, it rises less.

Mr. CAMPBELL. It rises a little for quite a distance back; what are the variations, take three and four miles back?

Mr. BERG. From Kabetogama Lake, where I actually took the levels, on this line here where I took the levels, there is a rise from the lake of about 14 feet in 3 miles.

Mr. CAMPBELL. I am not quite sure I understand the United States meander line; that is the line from which the surveyors measured up on the land from the water level elevation——

Mr. BERG. That is when the original Government survey was made, when they established a meander line.

Mr. CAMPBELL. And they would follow naturally the water line?

Mr. BERG. The margin of the water on the land.

Mr. CAMPBELL. I suppose now these lakes and their tributaries have risen, that you can not see the meander line?

Mr. BERG. I found some meander corners. The actual meander lines I did not see; they were all under water.

Mr. CAMPBELL. But would the general rise of the land at that time above the water be about the same as the land now rises above the present water line?

Mr. BERG. Not when I was there; the water was away when I was there.

Mr. CAMPBELL. In the old days did the water rise away above the water from the old meander line, as it does now from the present line?

Mr. BERG. Well, the water was very low, maybe lower than when it was surveyed this winter at Kabetogama Lake and that would be the condition it was in then.

Mr. CAMPBELL. When you take the natural normal level, there would be some land above the water that could not be drained in the old days, just as there is now at a considerably higher level. I am not asking you to make any estimate, because you could not measure it, but there must have been.

Mr. BERG. Oh, adjoining the lake, there must have been some there.

Mr. CAMPBELL. That becomes flooded, and you charge the value of it up to 498, or whatever you assume?

Mr. BERG. Yes, I charged any land according to Government survey, meander survey.

Mr. CAMPBELL. When you add again some more above that for difficulty or loss of drainage, you are really charging it twice?

Mr. BERG. No doubt what I put there is outside of a certain level, and if the water is not raised to that level, there would be no damage to it.

Mr. CAMPBELL. No matter where you lower the water to, you will always find some land just above the water level that can not be drained, for the same reason that this land now above the present level cannot be drained?

Mr. TAWNEY. Is any of the land that could not be drained at 498 included here?

Mr. BERG. No.

Mr. CAMPBELL. Is it not in the second sheet of F? Have you not made a computation there of it?

Mr. BERG. Yes, that is under the 498 feet; I do not think it could not be drained at all, but it would affect the drainage; it would make it harder.

Mr. CAMPBELL. At any level whatever, natural or normal, or raised 2 feet or 8 feet, that condition of things will exist to a certain extent?

Mr. BERG. Yes.

Mr. HILTON. These lands that you have put in, of which the drainage is affected, were beyond any contour line whatever?

Mr. BERG. No, it is beyond the contour line of 498.

Mr. RICHARDSON. How much beyond?

Mr. BERG. Right beyond.

Mr. RICHARDSON. How much?



Mr. BERG. That is impossible for me to tell. I never seen a contour that ran straight, so it might have been a quarter of a mile of one place, and it might be only a few rods of another.

Mr. CAMPBELL. What elevation did you take for that? What vertical line of land above the water that you thought would be affected?

Mr. BERG. 498 and anything about  $2\frac{1}{2}$  feet above that I considered affected that land further back.

Mr. CAMPBELL. Is that because the water would seep back from the lake, or because you could not get fall in your lake?

Mr. BERG. Because you could not get fall; it will seep back only to about a foot of height; it would get into the roots by that time.

Mr. CAMPBELL. You would have a foot and a half because of the want of fall?

Mr. BERG. Yes, the exactness of it I would not say.

Mr. ROCKWOOD. I would like to ask one question where I may have misunderstood. I understood you on Exhibit E to give the rise in the lake between sections one and two?

Mr. BERG. No, between one and twelve.

Mr. ROCKWOOD. And from that point westerly to——

Mr. BERG. To here [indicating].

Mr. ROCKWOOD. And you said the rise was how much?

Mr. BERG. The rise in a little over 3 miles was about 14 feet.

Mr. ROCKWOOD. That is what I understood you to say.

Mr. BERG. Yes. It might be a little over. Now, I will correct that, if you will allow me. There is a muskeg there. Now, the rise would be different if you go down to solid ground, or if you take the level on the top of the bed.

Mr. CAMPBELL. If you go down to solid ground the rise would be a great deal deeper?

Mr. BERG. No, I take it that way; the rise is 3 to 5 feet.

Mr. ROCKWOOD. In your computation of flooded lands, the drainage of which would be affected, you have included all the dark green on this map?

Mr. BERG. No, not all.

Mr. ROCKWOOD. About how far from it?

Mr. BERG. The exhibit shows that certain land is only affected when level 515 is accepted; if 515 is not accepted, that has nothing to do with it, and I will give you the reason why: this land here, sections 5 and 7, town 69, range 22 on the northern section; if level 515 is not accepted, it would drain either in the Rainy Lake or drain the other way, but the way I take it, on running those levels in there, that if level 515 is taken it might affect them, because there might be some low spots there where the water might run there.

Mr. TAWNEY. If a level below 515 is taken, it will not affect them at all?

Mr. BERG. No, it will not affect those lands at all.

Mr. HILTON. The plat and the exhibit shows that?

Mr. BERG. Yes.

Mr. HILTON. And you have not put in as lands affected by interference with drainage all State lands colored on this map as green?

Mr. BERG. No.

Mr. HILTON. Just those that actually would be affected?

Mr. BERG. Yes.

Mr. ROCKWOOD. I have in my hand Exhibit G. I find here the lands included entirely across that township sections 1, 2, 3, 4, 5, and 6: 69, 22?

Mr. BERG. Yes.

Mr. ROCKWOOD. Now, you have included the lands to the extreme westerly margin?

Mr. BERG. Yes, as conditional to level 515; 510 would not affect them.

(The committee adjourned till 8 p. m. this evening.)

#### AFTER RECESS.

The committee reconvened at 8 o'clock p. m.

Mr. TAWNEY. Gentlemen, we will proceed now, if you are ready.

Mr. HILTON. The State has no more testimony to offer at this time, but I wish to make one statement. When State Auditor Preus was on the stand he said that he did not know whether all the land that has been referred to as State land had been patented by the State or not, but he thought there was a gentleman present who could testify in regard to that. I find upon investigation that the man he had in mind is not so conversant with the situation as to be able to testify. Personally, I think, of course, that they have all been patented, but with the permission of the commission I will have prepared a certificate of the State auditor to the effect that all the lands shown on State Exhibits A, B, C, D, E, F, and G are patented lands, or, if any of them are not, what condition they are in, as to whether selected or otherwise, and send a copy of that to the Canadian section and the American section of the commission.

Mr. ROCKWOOD. Will you be good enough to add to that information the dates of the patents and the dates of the township surveys?

Mr. HILTON. I will endeavor to do that.

Mr. TAWNEY. Now, Mr. Samuelson, I think we will take up the lands that are owned by the parties you represent and dispose of that feature of the hearing as quickly as we possibly can.

#### TESTIMONY OF L. A. BERG—Continued.

L. A. BERG, who had been previously sworn, continued his testimony as follows:

Mr. SAMUELSON. You are the same L. A. Berg that testified for the State before recess?

Mr. BERG. Yes, sir.

Mr. SAMUELSON. Did you survey the lands of a number of settlers along Rainy Lake and the Rainy River district—lands that will be affected by the raising of the waters of Rainy Lake?

Mr. BERG. Yes, sir.

Mr. SAMUELSON. I show you a paper marked "Settlers Exhibit A," Mr. Berg, and ask you what that represents?

Mr. BERG. It is a list of the settlers that own land, part of which is submerged if the water is raised to certain levels, giving a description of their lands, and the number of record under each level.

Mr. MIGNAULT. Are those settlers on Rainy Lake?

Mr. BERG. They are on Rainy Lake and on Rat Root River and Black Bay.



Mr. SAMUELSON. Are the names of the settlers stated upon that exhibit and opposite their names is a description of the land owned by each given?

Mr. BERG. Yes, sir.

Mr. SAMUELSON. In the first column headed "Number of acres flooded" there is a figure. Does that figure represent the number of acres that are flooded at 498?

Mr. BERG. At the 498 level; yes, sir.

Mr. SAMUELSON. There are a number of names where there is no number of acres set out opposite the level 499 and the level 500. Why is that?

Mr. BERG. This is in the territory where we did not have any contour map. We could not set out any names. Whenever I did not have a contour map made by Mr. Meyer I could not set out the names.

Mr. SAMUELSON. From the name Herman Lomken down to the end of the list of names you have set out not only the number of acres flooded at the level of 498, but also at levels 499 and 500?

Mr. BERG. Yes, sir.

Mr. SAMUELSON. How did you ascertain the number of acres that are flooded at the 498 level?

Mr. BERG. The 498 level I got, as I have described before, by comparing my bench mark that I had.

Mr. SAMUELSON. What I am trying to get at is this: Is the number of acres of each one of these settlers that you have on this plat obtained from an actual survey at level 498?

Mr. BERG. Yes, sir.

Mr. SAMUELSON. And the balance are from comparisons with the contour lines prepared by the consulting engineers of the commission?

Mr. BERG. Yes, sir.

Mr. SAMUELSON. I offer Settlers' Exhibit A in evidence in connection with the witness's oral testimony.

Mr. RICHARDSON. I object to it as no sufficient ground has been laid for it, and the fundamental data upon which this must be based and from which the computations were necessarily made are not produced.

Mr. SAMUELSON. I have tried to prepare such a statement as would be of benefit to the commission and have tried to put it in such form that the commission might use it to the best advantage. It is based upon the contour lines of the consulting engineers of the commission, and it is the best that we have been able to get under the circumstances and conditions.

Mr. TAWNEY. The statement will be received in evidence subject to the objection of counsel and will be reported to the full commission. Mr. Berg, at the top of this list there are indicated lots 12 and 13, for example. Those lots are located in section 3, township 69, range 23?

Mr. BERG. Yes, sir.

Mr. TAWNEY. The letter "T" stands for township and the letter "R" stands for range?

Mr. BERG. Yes, sir.

Mr. SAMUELSON. The plats were filed by the State this afternoon. By a reference to those plats the description of these lands here can

be regularly located so that the commission will have no difficulty in following the actual location of the land. That is all the direct examination that I have of Mr. Berg.

Mr. MIGNAULT. In what county are those lots?

Mr. BERG. They are partly in St. Louis County and partly in Koochiching County.

Mr. MIGNAULT. Is that indicated on Settlers' Exhibit A?

Mr. BERG. No; it is not, but anything east of range 22 is in St. Louis County.

Mr. TAWNEY. Range 23 is in Koochiching County?

Mr. BERG. Yes.

Mr. ROCKWOOD. Suppose Mr. Berg just adds a note to Settlers' Exhibit A showing where these sections are located.

(Mr. Berg thereupon added the following at the bottom of Settlers' Exhibit A: "Range 21 and below is in St. Louis County; range 22 and above is in Koochiching County.")

Mr. RICHARDSON. Mr. Berg, on Settlers' Exhibit A you have a column after "descriptions" which is headed "Number of acres flooded."

Mr. BERG. Under level 498.

Mr. RICHARDSON. Under another heading which is above that "Level 498"?

Mr. BERG. Yes.

Mr. RICHARDSON. Level 498 you obtained in precisely the same way that you obtained it in connection with the State work?

Mr. BERG. Yes, sir; exactly.

Mr. RICHARDSON. That is, you obtained this level for the settlers and then used it in the State work?

Mr. BERG. No; I did not testify to that, Mr. Richardson. I said I had measured all I had surveyed by actual high water marks at the time I surveyed it, and I had made certain bench marks and then I compared those bench marks. It might be half a tenth different from 498.

Mr. TAWNEY. You say you compared it. Do you mean that you compared the bench marks with the readings on the gauges at Ranier and Fort Frances?

Mr. BERG. I got them on the same day.

Mr. RICHARDSON. I do not think you quite understand my question. You got gauge readings but once?

Mr. BERG. When I had to go out to Rainy Lake to get that, I got it at the same time for the settlers as I got it for the State for the purpose of testifying here.

Mr. RICHARDSON. You got it in connection with the settlers' work?

Mr. BERG. And the State.

Mr. RICHARDSON. And you had not started any of the State work at that time?

Mr. SAMUELSON. That is objected to as being incompetent, irrelevant, and immaterial, and just merely a matter of quibbling.

Mr. TAWNEY. Just state whether or not you had commenced work for the State at the time you took these readings from the gauges?

Mr. BERG. My work for the settlers was all finished. I got it only in last December just as a matter of comparison.

Mr. RICHARDSON. December of 1915, do you mean?

Mr. BERG. Yes, sir.



Mr. RICHARDSON. From what point below 498 did you make the computation?

Mr. BERG. From the Government meander.

Mr. RICHARDSON. At what level was that Government meander?

Mr. BERG. Whenever I could ascertain the Government meander by locating different meander posts, I would put it between 490 and 493. The actual meander line was covered with water and ice and I could not see it.

Mr. MIGNAULT. Will you state what you did when you found so many acres? What was the minimum line from which you counted it up to 498?

Mr. BERG. I took the Government meander line.

Mr. MIGNAULT. At what level?

Mr. BERG. 490 to 494—the Government meander line as it was carried out upon the plat and by the Government meander minutes.

Mr. MIGNAULT. Can you identify that with regard to each name on the list?

Mr. BERG. I could not, because I did not see the meander line. It was under water. There were about 6 feet of water over it at the time. It only showed on some points where I located certain meander corners from the field notes.

Mr. RICHARDSON. Will you explain how you could get the elevation from the field notes?

Mr. BERG. What elevation?

Mr. RICHARDSON. The elevation of 490 to 494.

Mr. SAMUELSON. 490 to 493 is what the witness testified to.

Mr. MIGNAULT. But it is very indefinite, Mr. Samuelson.

Mr. BERG. It might be 494. May I explain how that comes, your honor?

Mr. TAWNEY. Certainly; go ahead.

Mr. BERG. The Government places a post wherever a section line intersects a lake or a river. To that post mostly are established witness trees, to which they keep their records. From this record I established those posts. The posts might fall on top of the bank; they might come on lower land. So, naturally, the elevation of those corners would be different. It would not be and could not be the same.

Mr. RICHARDSON. Will you tell us how, from the Government notes, you could fix an elevation?

Mr. BERG. I did not fix one from the Government notes. I located the corner where it was and took soundings to what height I had then.

Mr. SAMUELSON. Your honor, regarding the question that you just asked with reference to where the meander corners were located, the instructions to surveyors were a little different in 1862 from the instructions that were given out in 1892. Under the instructions that were issued in 1862 it said to place the meander corner at low-water mark, but it went on and described just where the meander corner was to be established, namely, at the point below which no vegetation grew; that is, at the edge of vegetation. In the instructions that were issued by the Government to Government surveyors in 1892 they were told to locate the meander corners at ordinary high-water mark, and then they go on and describe that the meander corner shall be placed at the edge of vegetation. While in one

instruction they say it shall be placed at low-water mark, in the other they say it shall be placed at high-water mark, yet, at the same time, the method to be employed placed the meander corner at the same point, namely, the point where vegetation stopped, and I think that wherever your consulting engineers found the meander corner they found it located at the point where vegetation stopped.

MR. TAWNEY. On which instructions was this shore line surveyed by the Government?

MR. SAMUELSON. Some of the shore line was surveyed under the instructions of 1862.

MR. TAWNEY. What part of it?

MR. SAMUELSON. I am unable to give you the exact part. A portion of it was surveyed under the instructions of 1892; but Mr. Berg, in making his examination, will testify, and I believe your consulting engineers would say the same thing, that all of these posts, whether established under the old or the new instructions, were placed at the line of demarcation or where vegetation stops.

MR. MIGNAULT. Irrespective of the question of whether it was high or low?

MR. SAMUELSON. Whether it was high or low water mark, it was placed on the bottom at the edge of vegetation. Your plates that have been issued show the line of demarcation where vegetation stops, and at those points, wherever the consulting engineers have located the meander posts they have been found at the edge of vegetation.

MR. TAWNEY. I am informed by our consulting engineer, Mr. Meyer, that the upper end of Rat Root River was all surveyed under the new instructions and the rest of it was surveyed under the old instructions. That is, the rest is covered by the surveys made by the consulting engineers of the commission.

MR. SAMUELSON. Mr. L. A. Ogaard, who has been here, and whom I expect to be here again, made practically all of the surveys that were made.

MR. TAWNEY. You can call him later, Mr. Samuelson.

MR. RICHARDSON. It makes a considerable difference in the acreage whether you take the 490 level or whether you take the 494 level, does it not, Mr. Berg?

MR. BERG. It does. I did not take either level. I took the Government meander notes as they were given by the Government.

MR. RICHARDSON. Did you relocate the meander line for every Government subdivision?

MR. BERG. I relocated the Government meander posts, and then drew the meander lines from them as closely as could be done. There were about 6 feet of water over the meander lines, so I took the Government meander notes as my basis for the low or high water marks.

MR. RICHARDSON. How did you relocate the Government corners?

MR. BERG. From the Government field notes.

MR. RICHARDSON. In what way do you do that where the corners were under water?

MR. BERG. As I stated before—where the Government establishes a meander corner, if any trees are near they establish what they call a witness tree, and whenever I found that witness tree I took the Government meander.



Mr. RICHARDSON. Did you make notes in a book in establishing those corners or reestablishing them?

Mr. BERG. Yes, sir; I had the notes with me, the Government field notes I had copied from the land office in Duluth.

Mr. RICHARDSON. Did you make notes of your own in a book in regard to those corners which you reestablished?

Mr. BERG. Why, sure.

Mr. RICHARDSON. Where is the book?

Mr. BERG. I have not the book. I took the notes of what corners I established.

Mr. RICHARDSON. In this list of descriptions, Settlers' Exhibit A, how many corners did you reestablish where there were no witness trees to be found?

Mr. BERG. All I know of is one.

Mr. RICHARDSON. What was that one?

Mr. BERG. That was the meander corner between section 34 and section 27, township 71, range 23.

Mr. RICHARDSON. In every other instance you found the witness tree, did you?

Mr. SAMUELSON. That is, where he reestablished a meander corner?

Mr. RICHARDSON. Yes.

Mr. BERG. I would not say as to every one, but that is the only one I have in my mind.

Mr. RICHARDSON. Then you mean to have it understood that you found substantially all the witness trees?

Mr. BERG. Practically all. There might be one or two that I did not find. That was three years ago.

Mr. SAMUELSON. I object to this line of cross-examination, your honors, on the part of counsel for the reason that it is absolutely immaterial inasmuch as the Supreme Court of the State of Minnesota has held that the riparian owner owns to the low-water mark, and that has been confirmed by the Supreme Court of the United States. So that it does not make any difference whether it is the high or whether it is the low water mark. For that reason this cross-examination becomes absolutely immaterial.

Mr. TAWNEY. Mr. Samuelson, you will appreciate the fact that this committee is taking testimony for the commission as a master in chancery. It is not competent for the committee to either overrule or sustain. The testimony will have to be received subject to the objection, although I do not entirely agree with you in the view you have expressed.

Mr. SAMUELSON. The object of my objection was to call the matter to the attention of the commission when it is presented to the commission.

Mr. TAWNEY. If that is the understanding, all right. I did not know whether you expected the committee to rule on your objections or not.

Mr. SAMUELSON. Not at all, but just merely to call it to the commission's attention when they get to the point of passing upon it finally. Then they will have my objection before them and can guide themselves accordingly.

Mr. MIGNAULT. Mr. Samuelson, you claim that the title of the riparian owner extends down to low-water mark, subject to what-

ever rights the Federal Government may have in the nature of an easement in the use of the land for the purposes of navigation up to the ordinary high-water mark?

Mr. SAMUELSON. That is my position with reference to international waters. With reference to waters that are entirely with the State, the Supreme Court of the United States has held that it is for the State in which the land is located to regulate the matter within its own borders. They claim no ownership. The title to the bed of the stream is within the State, and being within the State, each State makes its own law in that respect, but while the riparian proprietor owns to the low water mark, it has been held in this State, it is merely a qualified right down to the low water and subject to the public use and the public easement up to the ordinary high water mark, which has been defined by our own Supreme Court as being that line of demarcation below which no vegetation grows.

Mr. MIGNAULT. And subject to the right of the Federal Government to maintain the water at the level of ordinary high water?

Mr. SAMUELSON. I assume that would be the natural consequence with reference to international water at least.

Mr. TAWNEY. That would apply only to navigable waters, however.

Mr. SAMUELSON. Navigable waters, yes.

Mr. MIGNAULT. I hardly think there is any distinction between international waters and national waters. I think the distinction is between navigable and nonnavigable waters. However, I am not familiar with your decisions nor with your laws. For my benefit, would you kindly give either now or at a subsequent date the decisions to which you refer?

Mr. SAMUELSON. The first case in this State, your honor, is the case of Schurmeier against the St. Paul & Pacific Railroad Co., 10th Minnesota, page 59. This same case was taken to the Supreme Court of the United States and was reported in that court under the title "Railroad Company against Schurmeier, 74 U. S., 7 Wallace, page 272. 19 Lawyers Edition, 74."

Mr. MIGNAULT. Affirming the decision of the Supreme Court of Minnesota.

Mr. SAMUELSON. Affirming the decision of the Supreme Court of Minnesota. The next case in which the Supreme Court of our State followed the decision in the Schurmeier case was that of Morrill against St. Anthony Falls Water Power Company, 26 Minnesota, page 222. In the case of the State of Minnesota against Korrier, 127 Minnesota, page 60, the Supreme Court of this State stated:

When the United States Government issues its patent to public lands bordering upon navigable water, the land under the water does not pass to the riparian proprietor by force of a patent, because the United States does not own it, but if the riparian owner acquires it at all it is by the concession or favor of the State which does own it.

In the case of *In re Lake Minnetonka Improvement Company*, in 56 Minnesota, page 513, the Supreme Court of our own State defined the term "high-water mark," and the term that was defined by our own Supreme Court in that decision has been continuously followed with reference to the term "high-water mark" ever since and has been approved by the Supreme Court of the United States. High-



water mark was defined by Judge Mitchell, one of the famous judges of our State, and I think of the country. He stated that it was that point beyond which no vegetation grew.

Mr. MIGNAULT. You will have an opportunity later of presenting your argument, Mr. Samuelson. I thought it would be useful to have these cases cited now.

Mr. ROCKWOOD. There is a later case in which the Minnetonka case is not quite fully sustained. The rule is a little more favorably enforced against the public. That is the case of Stenberg against the County of Blue Earth, 112 Minnesota, 117.

I think possibly I ought at this moment to say that I do not think Mr. Samuelson is quite accurate when he says that it is the point where vegetation ceases. I will discuss that later on.

Mr. MIGNAULT. I asked Mr. Samuelson because it is more convenient when counsel says such a point has been decided to give immediately the reference.

Mr. TAWNEY. You may now proceed, Mr. Richardson.

Mr. RICHARDSON. Mr. Berg, after reestablishing the Government corners in the manner in which you stated that you had reestablished them, you say that you drew a line from one corner to the other so reestablished?

Mr. BERG. I took, then, for the rest the minutes of the Government meander survey for the town, and from those I computed my areas.

Mr. RICHARDSON. How did you get at the level of that line?

Mr. BERG. I can not understand your question. I do not understand what you mean by getting at that level. I did not say that that line was on a certain level.

Mr. RICHARDSON. Did you establish any level for that line?

Mr. BERG. No; I did not.

Mr. RICHARDSON. Where did you get the 490 to 494 that you have been telling us about?

Mr. BERG. I knew what elevation to ask for at the time I was there. By cutting a hole in the ice and measuring down to the ground I could compute what it would be. It was not very much. I say they differed, but I got what it would be from 490 to 494.

Mr. RICHARDSON. In each line?

Mr. BERG. No; the different corners.

Mr. RICHARDSON. Then you say, now, that you did establish a level for those meander lines that you reestablished?

Mr. BERG. No; I did not. I took the meander lines by the notes that were given by the Government survey, of which I had a copy, and put them down, irrespective of level or anything else, because I could not find any line; the line was under water.

Mr. RICHARDSON. Then you paid no attention to the level of the line in making your computation?

Mr. BERG. Well, how could I?

Mr. SAMUELSON. What he is trying to get at, Mr. Berg, is this: He wants to know whether or not, after you had established that corner, if that was in the ice, you chopped a hole in the ice and went down to the solid ground in order to ascertain the depth of water from the bottom of what that line was up to the top of the ice?

Mr. RICHARDSON. No; that is not what I asked. Did you make a plot in each instance of the Government subdivision?

Mr. BERG. Yes, sir.

Mr. RICHARDSON. After reestablishing what you call the meander line in the way that you have indicated, how did you go to work to get the acreage between that so-called reestablished meander line and the elevation line of 498?

Mr. BERG. I have stated that I took the Government meander line for one line and the contour of 498, or what was at that time the high-water mark, for the other line, and the land between I put down as flooded land.

Mr. RICHARDSON. How did you get at the acreage between that reestablished meander line and that 498 level line?

Mr. BERG. Well, I figured it out.

Mr. RICHARDSON. But how did you do it?

Mr. BERG. I do not know just what you mean. I figured it out as any man would figure out any area between two given lines.

Mr. TAWNEY. Did you figure it by a planimeter or by cross section?

Mr. BERG. I figured it by cross section and by angles.

Mr. TAWNEY. Angles and distances?

Mr. BERG. Yes, sir.

Mr. RICHARDSON. Is that an accurate method?

Mr. BERG. Yes, sir.

Mr. RICHARDSON. You did not use a planimeter in any instance, did you?

Mr. BERG. No, sir; I did not.

Mr. RICHARDSON. In using those angles what rules of computation did you follow?

Mr. BERG. Different ones.

Mr. RICHARDSON. Will you give them to us?

Mr. BERG. There was triangulation and figuring by quadrangles. It was a matter of geometry.

Mr. RICHARDSON. Is that the best explanation you can give of the method that you used?

Mr. BERG. Yes; that is.

Mr. RICHARDSON. Who helped you do that?

Mr. BERG. Well, I do not know that anybody helped me.

Mr. SAMUELSON. I would like to ask Mr. Richardson whether this is for the purpose of assisting the commission or whether it is merely for the purpose of badgering the witness.

Mr. RICHARDSON. Mr. Berg, did you use the same method in getting at the acreage up to level 499?

Mr. BERG. No, sir.

Mr. TAWNEY. The witness has stated a number of times that he used the surveys or contour lines as shown on a map of the consulting engineers.

Mr. BERG. Yes, sir.

Mr. RICHARDSON. As to which lines?

Mr. BERG. From 498 to 499 and from 499 to 500.

Mr. TAWNEY. All the land above 498, as I understood him.

Mr. BERG. All the lines above 498, as nearly as I possibly could.

Mr. TAWNEY. You used the contours as shown on the maps of the consulting engineers?

Mr. BERG. I did.



Mr. RICHARDSON. I think, perhaps, I did not formulate the question quite as I intended. In getting at the acreage between the levels 498 and 499 did you use the same triangular method?

Mr. BERG. About the same; as nearly as I could put the contour of those maps down. I would not say it is exactly correct, but it is as near as I could make it.

Mr. RICHARDSON. You did not use a planimeter in that work?

Mr. BERG. No, sir; I told you that I did not.

Mr. RICHARDSON. And the same is true about the computation you made between 499 and 500?

Mr. BERG. Yes, sir.

Mr. TAWNEY. Mr. Richardson, the commission is in possession of information which it deems accurate as to the extent of land that is involved above elevation 497, and testimony was produced here this afternoon that the officials of the State and the consulting engineers are in entire accord with respect to the quantity of land that would be submerged between these contours; so I do not see that it is for the purpose of this commission very material how he arrived at the result.

Mr. RICHARDSON. From what I have seen of these exhibits, my impression is that the totals given by this witness do not agree with the figures which the commission's engineers have given.

Mr. TAWNEY. I understand from the consulting engineers and also from the testimony offered this afternoon that they are practically in accord as to the quantity of land involved. There is some little difference, but it is not very material.

Mr. RICHARDSON. My information is doubtless incorrect, but I was informed that there was a very material difference. I have not been able to make the comparison.

Mr. TAWNEY. I was referring to the State lands.

Mr. SAMUELSON. There is no dispute between the commission's consulting engineers and the settlers' engineer with reference to the amount of land involved.

Mr. TAWNEY. You are practically willing to accept the surveys of the consulting engineers of the commission as to the amount of your lands involved?

Mr. SAMUELSON. Certainly.

Mr. RICHARDSON. I think that is all.

Mr. MIGNAULT. It strikes me, Mr. Samuelson, that by reference to the maps prepared by the consulting engineers it ought to be possible to show the quantity of land between the two given contours.

Mr. SAMUELSON. That can be shown, your honor. It may be figured out with reasonable certainty.

Mr. TAWNEY. We have it already figured out.

Mr. SAMUELSON. Yes; and I think you will find that the figures we have given you are practically in accord with them.

Mr. TAWNEY. It is figured out as to the privately owned land and the State lands.

Mr. MIGNAULT. So far we have had no trouble as to the amount of acreage. There are other questions that have not been settled, such as the quality of the land, etc., but we have had no trouble with reference to the acreage.

Mr. SAMUELSON. I think that the surveys that have been made by the commission's consulting engineers and the contour lines drawn by them are in accord with those found by the engineer for the settlers as well as those of the State.

### TESTIMONY OF ALGOT ERICKSON.

ALGOT ERICKSON, having been duly sworn, testified as follows:

Mr. SAMUELSON. You are a resident of Koochiching County?

Mr. ERICKSON. Yes.

Mr. SAMUELSON. And are you the owner of the land known as the east half of the southwest quarter and lot 6, of section 27, township 71, range 23?

Mr. ERICKSON. Yes, sir.

Mr. SAMUELSON. And also the northeast quarter of the northwest quarter of 34?

Mr. ERICKSON. Yes.

(Lands marked on the plan with the name Erickson.)

Mr. SAMUELSON. Mr. Meyer will mark the other lands on the plan—south half of the northeast quarter and the northwest half of the northeast quarter and lot number 1 in the same section—that is the property of Carl Erickson, his father. How long have you owned that land?

Mr. ERICKSON. I filed on that land in the fall of 1904.

Mr. SAMUELSON. And have you been living on that land ever since?

Mr. ERICKSON. Yes.

Mr. SAMUELSON. Prior to the time that the water was raised, how much land did you have in meadow and under cultivation?

Mr. ERICKSON. When I filed on the land there was some natural cleared meadow there that hay had been cut on when I filed on it, and hay had been cut the same year I filed on it.

Mr. SAMUELSON. And prior to the time that the water was raised, how much did you have that you used—that is, cultivated land used for a hay meadow?

Mr. ERICKSON. I used about 100 acres of it.

Mr. SAMUELSON. At that time was there a very well defined bank there on your land; that is, where the high-water mark was?

Mr. ERICKSON. When I filed on it, do you mean?

Mr. SAMUELSON. Well, before they raised the water, could you locate the bank there, or could you see the bank?

Mr. ERICKSON. Yes, I could see it; part of the time of year I could see it and part of the time I could not see it.

Mr. SAMUELSON. When they raised the water to the point where it was when Mr. Berg made the survey, how much of your land was then under water—at the time Mr. Berg made that survey?

Mr. RICHARDSON. Objected to, as no foundation has been laid for it.

Mr. MIGNAULT. We will have to take it under reserve.

Mr. ERICKSON. About 111 acres was under water.

Mr. MIGNAULT. Did you measure it yourself?

Mr. ERICKSON. No, sir.

Mr. MIGNAULT. On what do you rely when you say there were 111 acres under water?

Mr. ERICKSON. Mr. Berg made it up.



Mr. SAMUELSON. You were there with him when he made the measurements?

Mr. ERICKSON. Yes.

Mr. SAMUELSON. And you knew where the corners of your land were?

Mr. ERICKSON. Yes.

Mr. SAMUELSON. And how much land did you have originally? About 120 acres?

Mr. ERICKSON. One hundred and fifty-seven acres originally.

Mr. SAMUELSON. And you know what land you had left?

Mr. ERICKSON. Yes.

Mr. SAMUELSON. If the water was raised 2 feet more, what effect would that have upon the balance of your land?

Mr. ERICKSON. I would not have much land; I would have a little of land here and there; it would be worthless for farming.

Mr. SAMUELSON. Have you buildings upon that land now?

Mr. ERICKSON. Yes.

Mr. SAMUELSON. What buildings have you?

Mr. ERICKSON. We have our living house and the stable, and the root cellar and the kitchen house.

Mr. SAMUELSON. What is the value of your living house?

Mr. ERICKSON. I should think about \$400.

Mr. MIGNAULT. A frame house?

Mr. ERICKSON. No, a log house.

Mr. SAMUELSON. About what is the value of your stable buildings?

Mr. ERICKSON. Oh, about \$200.

Mr. SAMUELSON. And your chicken coop?

Mr. ERICKSON. About \$75.

Mr. SAMUELSON. Is that chicken coop of yours logs or is that lumber?

Mr. ERICKSON. It is logs.

Mr. SAMUELSON. Would these buildings be affected if the waters would be raised 2 feet above where it was at the time Berg made the survey?

Mr. ERICKSON. I do not know, really, if the water would affect them, but the water would come pretty close up to them; I am sure of that.

Mr. SAMUELSON. Are those buildings on high or low ground?

Mr. ERICKSON. They are on high ground.

Mr. MIGNAULT. About how high over the water as it was when Mr. Berg went there with you?

Mr. ERICKSON. I would have to guess at it.

Mr. MIGNAULT. But about how high?

Mr. ERICKSON. I should judge about 4 or 5 feet.

Mr. TAWNEY. Is it that high now above the water?

Mr. ERICKSON. Yes, just about.

Mr. SAMUELSON. Is the water at this time higher or lower than it was at the time Mr. Berg made the survey?

Mr. ERICKSON. I do not know; it might have been higher or lower, but I do not think it is very much different; I do not remember.

Mr. MIGNAULT. It is really hard to say?

Mr. ERICKSON. It is hard to say.

Mr. SAMUELSON. Are there any trees out there in your field any place, Mr. Erickson, by which you could tell about the height

the water is? Have you measured it yourself, the height of the water that stands on portions of your land?

Mr. ERICKSON. Yes, it shows the discolorations on trees.

Mr. SAMUELSON. Do you know how deep the water is on portions of your land there now?

Mr. ERICKSON. It varies. I have not measured it, but it varies, from, I should judge, about 4 feet up to nothing.

Mr. MIGNAULT. Up to what?

Mr. ERICKSON. Down to nothing.

Mr. SAMUELSON. What was the nature of the soil of your land?

Mr. ERICKSON. The meadow land was black loam on clay bottom, and the high land, some of it, is sandy clay, and some of it is vegetable matter that had been black loam on clay.

Mr. SAMUELSON. How far is your land located from the village of Ranier?

Mr. ERICKSON. About 4 miles.

Mr. SAMUELSON. Is there a highway leading from Ranier to your place?

Mr. ERICKSON. Yes.

Mr. SAMUELSON. And there is an automobile road, is there, between here and Ranier?

Mr. ERICKSON. Yes, sir.

Mr. SAMUELSON. Can you use an automobile all the way out to your place in the summer time?

Mr. ERICKSON. No, sir.

Mr. SAMUELSON. But you can drive from Ranier out to your place in the summer time?

Mr. ERICKSON. I can now—this last summer.

Mr. SAMUELSON. And in the wintertime there is a good road between your own place and Ranier?

Mr. ERICKSON. Yes.

Mr. SAMUELSON. In fact, you take children over that road every day to and from school?

Mr. ERICKSON. Yes.

Mr. SAMUELSON. What is the value of your land per acre?

Mr. ERICKSON. I consider my land worth about \$60 an acre, and high land where it is timber about \$50 an acre.

Mr. SAMUELSON. Now, with reference to your father's land, Carl Erickson, how does that land lie? That is, your father owns the south half of the northeast quarter, and the northwest quarter of the northeast quarter, and lot No. 1?

Mr. ERICKSON. Yes; that is next to me.

Mr. SAMUELSON. It lies next to you?

Mr. ERICKSON. Yes.

Mr. SAMUELSON. And what is the nature of the soil on your father's land?

Mr. ERICKSON. It is black loam on clay bottom, about the same nature as mine.

Mr. SAMUELSON. How much of that land is there that is in meadow?

Mr. ERICKSON. I forget; I have it marked down in the book.

Mr. SAMUELSON. I think you can refer to it, with the permission of the committee, on the map.

Mr. RICHARDSON. Is that Mr. Berg's map?



Mr. ERICKSON. Yes.

Mr. RICHARDSON. You have just the figures Mr. Berg gave you?

Mr. ERICKSON. He figured the acreage, that is all.

Mr. SAMUELSON. Just refer to the map.

Mr. ERICKSON. Thirty-five acres.

Mr. SAMUELSON. In meadow?

Mr. ERICKSON. Yes.

Mr. SAMUELSON. Does the water, at the point where it now is, flood all the meadow?

Mr. ERICKSON. Yes.

Mr. SAMUELSON. How much land is flooded besides the 35 acres of meadow land at this present stage of the water?

Mr. ERICKSON. Forty-two acres of the timbered land.

Mr. SAMUELSON. What is the nature of the timber?

Mr. ERICKSON. It is poplar, Balm of Gilead, and a few scattered oak amongst them.

Mr. SAMUELSON. And what is the depth of the water upon your father's place, where the water stands in amongst his wood?

Mr. ERICKSON. Well, the highest the water was, it was about a foot, 6 inches, or a foot, and somewhere round there.

Mr. SAMUELSON. From 6 inches to a foot?

Mr. ERICKSON. Yes.

Mr. SAMUELSON. Down to?

Mr. ERICKSON. Down to nothing.

Mr. MIGNAULT. When did your father file on that land?

Mr. ERICKSON. 1906 or 1907.

Mr. MIGNAULT. After you?

Mr. ERICKSON. Yes.

Mr. MIGNAULT. Was it before the water was raised?

Mr. ERICKSON. Before, yes.

Mr. MIGNAULT. Has your father any buildings?

Mr. ERICKSON. Yes, he has.

Mr. MIGNAULT. What kind?

Mr. ERICKSON. I have it marked up; probably I can tell you; the living house is 14 by 24, and a cellar under that, and a kitchen 12 by 12, a slant roof kitchen built onto the log house.

Mr. MIGNAULT. All the buildings are log construction?

Mr. ERICKSON. Yes, and a porch and horse stable and hay shed 20 by 48, and the storehouse is 15 by 20, and the cow stable is 14 by 12 by 20, and the ice house about 14 by 14, all the buildings with a shingle roof on.

Mr. SAMUELSON. All the buildings have shingle roofs on?

Mr. ERICKSON. Yes.

Mr. SAMUELSON. About what is the value of the buildings upon your father's land?

Mr. ERICKSON. They are worth about \$800 or \$1,000.

Mr. SAMUELSON. If the water were raised about 2 feet higher than the water is at the present time, what effect would that have upon the buildings upon your father's land?

Mr. ERICKSON. The water would go up on to some of the buildings.

Mr. SAMUELSON. Your father's buildings are a little lower down than yours?

Mr. ERICKSON. Yes, sir.

Mr. TAWNEY. Are the buildings only 2 feet above the water at the present time?

Mr. ERICKSON. About  $2\frac{1}{2}$  or 3 feet, the living house; the stable, I think, is a trifle lower.

Mr. SAMUELSON. How high is the water there now compared with what was the ordinary high water at the time you and your father located on that land?

Mr. RICHARDSON. Objected to, on the ground that no foundation is laid to show that the witness knows what the ordinary high water mark was at any time.

Mr. TAWNEY. You can answer the question. It will be received subject to the objection.

Mr. ERICKSON. I can not tell it in feet.

Mr. SAMUELSON. Give it as nearly in feet as you can.

Mr. ERICKSON. Ordinarily about 5 or 6 feet; sometimes it was more and sometimes less.

Mr. MIGNAULT. You understand the question, do you; what is the difference between the water to-day and the water when it was at the stage of ordinary high water?

Mr. ERICKSON. Well, the water varied before it was——

Mr. MIGNAULT. Ordinary high water is a fixed level, as I understand it. I am afraid you do not quite understand the question.

Mr. SAMUELSON. Wherever the water stands for such a length of time, so that there is no vegetation growing below that line; now, when the water comes up to where the vegetation grows, how much higher now is the water than it was when it was standing up to the point of vegetation?

Mr. ERICKSON. I should think that was about 5 or 6 feet.

Mr. SAMUELSON. I have no further questions of Mr. Erickson.

Mr. MIGNAULT. He has not proved the value of his father's land.

Mr. SAMUELSON. What is the value of your father's land?

Mr. ERICKSON. A while ago a party wanted to buy 10 acres from him——

Mr. RICHARDSON. Objected to.

Mr. MIGNAULT. State what you know of your own knowledge.

Mr. ERICKSON. \$50 an acre.

Mr. TAWNEY. How much is meadow land?

Mr. ERICKSON. Thirty-five acres.

Mr. TAWNEY. How much hay did it yield per acre?

Mr. ERICKSON. We farmed the two places together, and he used his meadow for pasture, and we cut the hay on his a couple of years, and then we used it for pasture.

Mr. TAWNEY. Is that 35 acres meadow now?

Mr. ERICKSON. It has been under water for several years.

Mr. TAWNEY. Was that 35 acres the acreage when your father went on there or until the dam was built here?

Mr. ERICKSON. Yes.

Mr. TAWNEY. How many acres has he now in meadow?

Mr. ERICKSON. He has not any.

Mr. TAWNEY. That is, in pasture?

Mr. ERICKSON. He has not any hay meadow in pasture; it is under water.

Mr. TAWNEY. It is all under water?

Mr. ERICKSON. Yes.



Mr. TAWNEY. Is that all of the land owned by your father that is under water?

Mr. ERICKSON. No; there would be about 77 acres left that is over water—that is timbered land.

Mr. MIGNAULT. You said there was some timbered land that was under water?

Mr. ERICKSON. Yes.

Mr. MIGNAULT. How much timbered land?

Mr. ERICKSON. I think it was—I can refer to this paper here again—42 acres.

Mr. TAWNEY. Forty-two acres of timber land under water, in addition to the 35 acres of meadow land?

Mr. ERICKSON. Yes.

Mr. MIGNAULT. Was that wild hay?

Mr. ERICKSON. Yes.

Mr. TAWNEY. What do you estimate the value of the 42 acres with the timber on it?

Mr. ERICKSON. About \$50 an acre.

Mr. TAWNEY. When was this 42 acres first overflowed?

Mr. ERICKSON. 1912. It was not so much overflowed then as it was later on—in 1913 and 1914—but it started seepage or soaking into the ground, and it was in pretty bad shape.

Mr. SAMUELSON. How much hay did you cut an acre on your meadow when you cut it?

Mr. ERICKSON. From one to ten tons an acre.

Mr. SAMUELSON. What do you call the kind of hay that you raised on that?

Mr. MIGNAULT. He said wild hay.

Mr. SAMUELSON. There are several kinds of wild hay.

Mr. ERICKSON. It is a blue joint.

Mr. SAMUELSON. This is what is called blue joint?

Mr. SAMUELSON. And is that a good quality of hay?

Mr. ERICKSON. Yes.

Mr. MIGNAULT. What does it bring per ton?

Mr. ERICKSON. I have not seen any of it sold for several years; but I could not cut any of it, so that I can not tell what blue joint would bring, but wild hay brings \$13 to \$14 and \$15 a ton here in the Falls.

Mr. RICHARDSON. How old are you?

Mr. ERICKSON. Forty-two years old, or I will be.

Mr. RICHARDSON. Are you married?

Mr. ERICKSON. No, sir.

Mr. RICHARDSON. You went to live on your land when?

Mr. ERICKSON. 1904.

Mr. RICHARDSON. When did you get the patent of your land?

Mr. ERICKSON. I have forgotten; it was five years after.

Mr. MIGNAULT. You did get it?

Mr. ERICKSON. Yes, sir, five years or five years and a half after.

Mr. RICHARDSON. Who located you on that land?

Mr. ERICKSON. I forget the name of the locator, but it was through Ingram and Nord: they had their office in Minneapolis.

Mr. RICHARDSON. Senator Nord?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. He is State senator for this county?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. You say that you had 100 acres of cultivated and meadow land?

Mr. ERICKSON. Altogether 157 some acres.

Mr. RICHARDSON. Of cultivated and meadow land?

Mr. ERICKSON. Not cultivated; cultivated and meadow land I had 111 or 112 acres.

Mr. RICHARDSON. How do you know that?

Mr. ERICKSON. Well, Mr. Berg figured out the amount of hay meadow and what was ploughed and cultivated land—

Mr. RICHARDSON. How much of that 111 acres was cultivated land?

Mr. ERICKSON. Three acres seeded on and about two and a half acres of cleared land; I can refer to it.

Mr. RICHARDSON. Making in all about  $5\frac{1}{2}$  acres of cultivated land?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. That acreage is what Mr. Berg told you was the acreage, is it not?

Mr. ERICKSON. He said it amounted to that much acreage.

Mr. RICHARDSON. And you do not know yourself as to how many acres there were cultivated, except by what Mr. Berg told you, do you?

Mr. ERICKSON. Flooded, no—no, I did not figure how much it was.

Mr. MIGNAULT. I suppose he can say there is about so much?

Mr. ERICKSON. Yes, I can.

Mr. RICHARDSON. These two pieces of land that were cultivated did not adjoin each other, did they?

Mr. ERICKSON. Yes, they did.

Mr. RICHARDSON. Do you know what I mean by adjoin?

Mr. ERICKSON. Yes, they did.

Mr. RICHARDSON. Were they separated by anything?

Mr. ERICKSON. No, sir—oh, well, there was a fence running through, running across.

Mr. RICHARDSON. Did that fence run about east and west?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. And some of the land that was cultivated was north of the fence, was it?

Mr. ERICKSON. Yes, sir.

Mr. RICHARDSON. Was there a road or driveway into your place along that fence?

Mr. ERICKSON. There was in wintertime but not in summer.

Mr. RICHARDSON. And that roadway was on the north side of the fence?

Mr. ERICKSON. No; it was on the south side of the fence.

Mr. RICHARDSON. In summer where was the driveway into your place?

Mr. ERICKSON. It was no driveway really in the summer; it was gates to go through with cattle; well, you could drive through different places.

Mr. RICHARDSON. There was a highway, was there not, which terminated, ended on the west line of your place?

Mr. ERICKSON. It ran right into my place, the highway from town.

Mr. RICHARDSON. And stopped there, did it not?

Mr. ERICKSON. It was legalized, I think, to the quarter line.



Mr. RICHARDSON. That is your west line?

Mr. ERICKSON. My east line; I think it was legalized to there.

Mr. RICHARDSON. Your east line or west line?

Mr. ERICKSON. My east line.

Mr. RICHARDSON. Right through your place?

Mr. ERICKSON. I think it was legalized as far as the quarter line; I got that impression.

Mr. RICHARDSON. Where did that road enter your land on the west?

Mr. ERICKSON. It entered on the forty line, or it followed the section line and ended between my forty in 34 and what land I had in 27.

Mr. RICHARDSON. How much of that cultivated land was north of that road?

Mr. ERICKSON. Well, the road was not used, so that where the road should have been that was cultivated, too.

Mr. RICHARDSON. You cultivated the legal highway?

Mr. ERICKSON. Yes; because it was never used and could not be used.

Mr. RICHARDSON. And that legal highway was 4 rods wide, was it not?

Mr. ERICKSON. Yes; supposed to be.

Mr. RICHARDSON. What was the length of the cultivated strip north of the fence?

Mr. ERICKSON. I can not say; I did not measure it; I stepped it out once, but I have forgotten.

Mr. RICHARDSON. What was the width of the cultivated strip that was north of the fence?

Mr. ERICKSON. I can not say that either, exactly.

Mr. RICHARDSON. How far from the fence to the south was the cultivated piece on the south side of the fence?

Mr. ERICKSON. There was not any cultivated ground on the south side; it was cleared and seeded down.

Mr. RICHARDSON. Then that piece that you say was cleared and seeded down you included in the five and a half acres which you said was cultivated, did you not?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. So that, as a matter of fact, you had, according to what Mr. Berg told you, about 2 acres of cultivated land?

Mr. ERICKSON. I would have about 3 acres that was affected with high water.

Mr. RICHARDSON. Do you mean that you had some cultivated land in addition to that 3 acres which was not affected by water?

Mr. ERICKSON. I had a little, I think; I had some.

Mr. RICHARDSON. Don't you mean that all your cultivated land was included in the 3 acres?

Mr. ERICKSON. I do not think so; no, sir.

Mr. RICHARDSON. Where was the other piece of cultivated land?

Mr. SAMUELSON. I object to this line of examination.

Mr. RICHARDSON. That was not affected by water?

Mr. SAMUELSON. I object to this examination as being trivial, badgering, and not for the purpose of aiding the commission at all, nor ascertaining what the commission is after. It rather appears to be for the purpose of badgering the witness, rather than assisting the commission.

Mr. MIGNAULT. I do not think you can say he is badgering the witness, but the point I would like to test the witness's evidence in regard to is how he arrives at the values. That is very material.

Mr. RICHARDSON. Will you let me see Mr. Berg's plat that you refer to when you get at your acreage?

Mr. ERICKSON. Yes; here it is.

Mr. SAMUELSON. I may say, for the benefit of the committee, that Mr. Richardson has been over this same subject matter with this witness before, and the matter has been gone over with him before. He knows what the witness has testified to. It is a matter of record in this court.

Mr. MIGNAULT. I think it would shorten proceedings if you allowed the examination to continue.

Mr. TAWNEY. What we want to know is the amount of land that he owns that is submerged, or would be submerged, if the level of the lake was raised above 497 and what the value of the land is. He has testified as to the quantity of the land. The accuracy of his statement may be tested as to the quantity and value of the land. There are a number of other witnesses and we would be glad to get through to-morrow night.

Mr. RICHARDSON. I should be glad to stop at any time, but I regard this as a very important situation.

Mr. TAWNEY. You can proceed.

Mr. RICHARDSON. You state that you had 157 acres?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. How do you know that?

Mr. ERICKSON. It said so on the patent I received—the Government receipt said 157 acres and some fraction.

Mr. RICHARDSON. Did it say 157 more or less?

Mr. ERICKSON. It said 157 acres and some fractions, I have forgotten how much.

Mr. RICHARDSON. More or less?

Mr. ERICKSON. I do not remember seeing that.

Mr. RICHARDSON. And it is from that statement in the Government receipt that you arrived at the figures 157 acres?

Mr. ERICKSON. Yes.

Mr. MIGNAULT. I think it was sufficient warrant for him.

Mr. RICHARDSON. How did you get at the number of acres that were timberland?

Mr. ERICKSON. We could see the water up amongst the timber, and then we followed that water line, where the water had been, and Mr. Berg figured out how many acres were inside of that.

Mr. RICHARDSON. That is when you said that there were so many acres of timberland, you simply say what Mr. Berg told you?

Mr. ERICKSON. The amount of acres, yes.

Mr. RICHARDSON. And when you say how much acreage you had in meadow, you simply state what Mr. Berg told you, do you not?

Mr. ERICKSON. That is right, to be accurate; I could estimate, but not so closely.

Mr. MIGNAULT. But to the best of your knowledge, without being precise, do you estimate you have the quantities mentioned?

Mr. ERICKSON. I think it is right, what the maps show.

Mr. RICHARDSON. Now, is it a fact that there is a large hill or bench mark of rock that extends across what you call your meadow?



Mr. ERICKSON. It is a ledge cropping out two or three places on the meadow; yes, sir.

Mr. RICHARDSON. There is a ledge which extends from your westerly line easterly across your land, is there not?

Mr. ERICKSON. There is no rock running across to my land; no.

Mr. RICHARDSON. How far out from your west line does that rock ledge extend?

Mr. ERICKSON. There is no rock at all of that kind on my west line; there is a ridge running across my north forty, but that ledge referred to on the map—there is no ledge on that.

Mr. MIGNAULT. That map has not been filed; better not refer to it.

Mr. ERICKSON. There are loose bowlders and rocks on it, but there is no ledge on that.

Mr. RICHARDSON. Is that not based on a ledge?

Mr. ERICKSON. I do not know.

Mr. RICHARDSON. How high is that hill or bench?

Mr. ERICKSON. I should think there are different heights, from a foot to two or three feet over the hay meadow.

Mr. RICHARDSON. How long is it?

Mr. ERICKSON. It runs across the forty.

Mr. RICHARDSON. And how wide is it?

Mr. ERICKSON. Different widths.

Mr. RICHARDSON. In getting at the acreage of the hay meadow, how much did you take out of the forty on account of that hill?

Mr. ERICKSON. We took out that hill.

Mr. RICHARDSON. How many acres did you take out for it?

Mr. ERICKSON. I do not know how many acres there is in that strip.

Mr. RICHARDSON. How can you say that you think that the figures that Mr. Berg gave you are about right?

Mr. ERICKSON. Well, he says how much high ground there is, and how much buried on that forty.

Mr. RICHARDSON. Mr. Berg told you how much?

Mr. ERICKSON. He figured it out in acres; I could judge how much high ground there was, but he figured it out in acres.

Mr. RICHARDSON. How many acres of high ground do you judge there were in that hill?

Mr. ERICKSON. About 6 or 7 acres.

Mr. RICHARDSON. Is there any other hill in the meadow?

Mr. ERICKSON. There are two other what you call hills or high ground in that meadow.

Mr. RICHARDSON. On what forty?

Mr. ERICKSON. Same forty.

Mr. RICHARDSON. That is, on the north forty?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. Where are they?

Mr. ERICKSON. They are near the other ridge, one on the east side and one on the south side.

Mr. RICHARDSON. Now, the one on the east side of the forty is how long?

Mr. ERICKSON. I did not measure it.

Mr. RICHARDSON. Give us your best judgment.

Mr. ERICKSON. About 9 rods long, I should say.

Mr. RICHARDSON. And how wide?

Mr. ERICKSON. About the same width as it is long—about as wide as it is long.

Mr. RICHARDSON. And about how high?

Mr. ERICKSON. About 3 or 4 feet over the hay meadow and on that high ground it shows a ledge.

Mr. RICHARDSON. There is rock on that one?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. Do you know what kind of rock it is?

Mr. ERICKSON. It is rock, I know; that is all.

Mr. RICHARDSON. Have you seen the rock that is found in International Falls?

Mr. ERICKSON. I have seen it.

Mr. RICHARDSON. Have you seen the rock that forms the foundation of the islands in Rainy Lake?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. Do you know that that is called Koochiching granite?

Mr. ERICKSON. No, sir.

Mr. RICHARDSON. Is this rock which is on your place the same kind of rock?

Mr. ERICKSON. I could not say.

Mr. RICHARDSON. Does it look to be the same?

Mr. ERICKSON. I could not say. All I know is that it is rock.

Mr. RICHARDSON. Is that rock in a ledge or in boulders?

Mr. ERICKSON. It is in a ledge on that piece.

Mr. RICHARDSON. Where on the north forty is the third hill?

Mr. ERICKSON. It is near the southwest crossing of the forty, or nearer the south line of the forty.

Mr. SAMUELSON. I again desire to enter my objection to this line of cross-examination.

Mr. MIGNAULT. Why?

Mr. SAMUELSON. On the ground that it will not materially aid the committee, and that it is merely taking up the time of the commission for no useful purpose.

Mr. MIGNAULT. I think it is cross-examination. I have already indicated to Mr. Richardson what, to my mind, is the material inquiry. I recognize that there is some force in what he is endeavoring to show, that there is a ledge of rock comprised in that meadow land and he is endeavoring to find out what is the acreage of the rocky portion.

Mr. TAWNEY. He may answer it, subject to objection.

Mr. RICHARDSON. How long is that ledge or hill which is north of the south line of the north forty?

Mr. ERICKSON. I never measured it.

Mr. RICHARDSON. Give us your best judgment.

Mr. TAWNEY. Has he not stated that?

Mr. ROCKWOOD. That is the first one.

Mr. RICHARDSON. How long?

Mr. ERICKSON. About 20 rods long.

Mr. RICHARDSON. And how wide?

Mr. ERICKSON. Five or six rods some places, some places more and some places less.



Mr. RICHARDSON. What is the greatest width?

Mr. ERICKSON. I guess about 5 or 6 rods.

Mr. RICHARDSON. And how high is that hill?

Mr. ERICKSON. I should judge it was 3 or 4 feet over the meadow.

Mr. RICHARDSON. And those three hills are on the north 40?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. Would that north forty be worth more if those three hills were not on it?

Mr. ERICKSON. It would certainly not be worth any more now; it would be worth less now; it would be worth less now; if those hills are worth anything, it is worth so much more now, because all the meadow land is under water, but the hills or the high mound is not.

Mr. TAWNEY. Did you raise anything on those hills?

Mr. ERICKSON. On one of the hills, where there was about three quarter acres cleared, I used to raise potatoes, and now I have it seeded down to hay, but part of that is affected by water; three quarter acres runs across that there, and both ends of it are affected with water; some of the rest of it, there is seepage round it, and when I seeded it I found I could not get three acres of potatoes, and I could not get horses in there to cultivate it.

Mr. RICHARDSON. On which forty are your buildings?

Mr. ERICKSON. On the middle forty.

Mr. RICHARDSON. Do you mean on the forty which is next south of the north forty?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. Are there any hills on that forty?

Mr. ERICKSON. There is where my house stands.

Mr. RICHARDSON. How long is that hill?

Mr. ERICKSON. I never measured that hill.

Mr. RICHARDSON. Give us your best judgment?

Mr. ERICKSON. I guess about fifteen rods.

Mr. RICHARDSON. How wide?

Mr. ERICKSON. About the same width.

Mr. RICHARDSON. How high?

Mr. ERICKSON. About four or five feet over the meadows or six.

Mr. RICHARDSON. Is your house at the highest point on that hill?

Mr. ERICKSON. No, the highest point is rock.

Mr. RICHARDSON. Is that a rock ledge also?

Mr. ERICKSON. The ledge is cropping up one place on that hill—just two places.

Mr. RICHARDSON. Are all your buildings on that hill?

Mr. ERICKSON. Yes, except the chicken coop; that is not on that hill.

Mr. MIGNAULT. It occurs to me you possibly have some evidence that you would offer as to all these facts, the fact of his having ledges of rock in the meadow land, and if so, it would shorten your cross-examination if you would, when the time comes, put in the evidence, which would naturally, I presume, be more of a precise nature than the witness is able to give himself.

Mr. RICHARDSON. It will be, but my idea about this examination has been that it would test, to the satisfaction of the committee, the accuracy of what, perhaps, might be termed flowing statements.

Mr. MIGNAULT. I see your object, but it occurred to me that perhaps if you had evidence which you intended to submit, it would shorten

proceedings. You will recognize the commission is sitting in Winnipeg on the 1st of February, and we endeavored, as far as possible, to hear all interested parties here, and we have come for that special purpose. I do not wish to restrict your cross-examination, of course. You will have that fact in view.

Mr. SAMUELSON. I may say that I came here in perfect good faith for the purpose of presenting this testimony. I can not stay longer than to-morrow evening, and if the testimony can not be gotten in by that time, I will have to leave, as I have other obligations. I have understood that the committee would stay here no longer than to-day and to-morrow, and I have made my arrangements accordingly. The purpose of the cross-examination is perfectly plain to me. This man, as well as a large number of the other settlers, in fact, all the other settlers whom I represent, now have an action pending against the Minnesota & Ontario Power Co. to recover damages by reason of the raising of the water to the point at which it now is. The cross-examination that these witnesses will be subjected to is for the purpose of laying the foundation to be used upon the trial of these actions and not for the purpose of aiding the committee in any way.

Mr. RICHARDSON. In answer to the last statement——

Mr. MIGNAULT. I think it is cross-examination, but at the same time I asked Mr. Richardson if there was any way to shorten it, on account of the number of witnesses we desire to hear.

Mr. SAMUELSON. With reference to this particular witness, I will say to the commissioners that this case has been tried in this very courtroom. I have a copy of the testimony that was taken upon the trial of that action, and if the commissioners are of the opinion that it would be of any aid or assistance to the committee to have a copy of the testimony, or the book made up in the trial of that action, I would be glad to furnish it to them—where this man has been cross-examined thoroughly—not only that, but other witnesses pertaining to the same subject matter, and if the committee desires to have that testimony I will be glad to furnish it, to shorten this up, as I am anxious to furnish all the aid I can to the committee, and at the same time my time is limited, the same as these people who are here at their own expense——

Mr. MIGNAULT. Let us get down to business.

Mr. RICHARDSON. In view of the suggestion of counsel as to my purpose, I desire to state that I did not cross-examine this witness at the time of this trial; that that case was dismissed by the court at the close of the plaintiff's testimony; that Mr. Samuelson has taken an appeal, after moving for a new trial, which was denied him, and the case is pending in the Supreme Court of the State of Minnesota upon their appeal.

Mr. MIGNAULT. But any evidence that was taken in such a case would not be evidence before the committee.

Mr. RICHARDSON. It absolutely wipes out Mr. Samuelson's statement that I am doing this for the purpose of getting evidence from Mr. Erickson.

Mr. SAMUELSON. I shall be glad to have that statement in the record, so that I may refer to it at some future time, because I am sure it will crop up.



Mr. RICHARDSON. Who told you that your land was worth \$50 an acre?

Mr. ERICKSON. Nobody told me; it is worth that to me.

Mr. RICHARDSON. You do not mean to say that it is worth \$50 an acre at fair market value, do you?

Mr. ERICKSON. It is not for sale. You asked me what it is worth. It is worth \$50 an acre.

Mr. RICHARDSON. To you?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. And when you made your statement as to values, you merely meant that you put an estimate on the land as to its value to you?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. And the same is true as to that part of that land which you said was worth \$50 an acre, is it not?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. You personally do not know anything about elevations on your land as connected with any particular bench mark, do you?

Mr. ERICKSON. No, sir.

Mr. RICHARDSON. You stated, did you not, that in your timber there were marks of high water on the trees?

Mr. ERICKSON. When the water was at the highest, and went down, it left discoloration on the bark of the trees; it shows right to-day.

Mr. RICHARDSON. And how high up on the trees, from the ground, is the upper edge of that discoloration?

Mr. ERICKSON. It depends on where the tree was standing. If the tree was standing on higher ground, it would be nearer the root. If the tree was on lower ground the discoloration would be higher up from the tree trunk than if it was standing on higher ground.

Mr. RICHARDSON. Where it was standing on low ground, how high did it extend up?

Mr. ERICKSON. I never measured that.

Mr. RICHARDSON. Give us your best judgment?

Mr. ERICKSON. From a few inches up to a foot, and I have seen on trees on my father's place——

Mr. RICHARDSON. Let us stick to your place, please; where is the lowest tree that you refer to?

Mr. ERICKSON. I can not tell.

Mr. RICHARDSON. What forty is it on?

Mr. ERICKSON. I can not say; there are trees on the north forty or on the south forty that show discolorations.

Mr. RICHARDSON. You have given us the height of the discoloration on trees in the lowest part of your land, have you not?

Mr. ERICKSON. No; in the lowest part of the land there are no trees growing.

Mr. RICHARDSON. I mean in the lowest part of the land where the trees are?

Mr. ERICKSON. It shows discoloration on trees on the low ground from a few inches to probably a foot; it depends on where the trees are standing.

Mr. RICHARDSON. Where is the lowest tree?

Mr. ERICKSON. That I can not say.

Mr. RICHARDSON. Can you tell what forty it is on?

Mr. ERICKSON. No, sir.

Mr. RICHARDSON. Did your father get a patent for his land?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. In what year?

Mr. ERICKSON. I think it was in 1912; what time I do not know.

Mr. RICHARDSON. How long before your father got his patent did you get your patent?

Mr. ERICKSON. I can not tell exactly.

Mr. RICHARDSON. Give us your best recollection?

Mr. ERICKSON. Two or three years.

Mr. RICHARDSON. Have you made the measurements of your father's buildings yourself?

Mr. ERICKSON. Yes, sir; in a rough way.

Mr. RICHARDSON. You gave exact figures; where did you get those figures?

Mr. ERICKSON. I measured it.

Mr. RICHARDSON. And you remember those figures?

Mr. ERICKSON. I got them in the book here.

Mr. RICHARDSON. When did you put them in the book?

Mr. ERICKSON. It was some time last summer, in the summer of 1915.

Mr. RICHARDSON. Did Mr. Berg make the measurements?

Mr. ERICKSON. No, sir.

Mr. RICHARDSON. When did Mr. Berg make the measurements on your land?

Mr. ERICKSON. I think it was in 1914.

Mr. RICHARDSON. What month?

Mr. ERICKSON. It was in January, I believe.

Mr. RICHARDSON. Do you remember at what time in January he began?

Mr. ERICKSON. No, sir.

Mr. RICHARDSON. How many days on the work there?

Mr. ERICKSON. He was at my place about a week. He stayed at my place there, but he did not work on my land a week; he was there about a week; I forget how long he worked on my land.

Mr. RICHARDSON. And all the work he did on your land was in January, 1914, was it not?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. Was it the first half or second half of January?

Mr. ERICKSON. That I do not remember.

Mr. RICHARDSON. Now, in regard to the acreage of your father's meadow, did Mr. Berg furnish those figures to you?

Mr. ERICKSON. He figured out the amount of acreage.

Mr. RICHARDSON. And you gave the acreage as what Mr. Berg told you?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. Now, you have given some values as to your father's land?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. Those values are merely what the value would be to you?

Mr. ERICKSON. What I think the value is.



Mr. RICHARDSON. That is what you think the value would be to you?

Mr. ERICKSON. Well, I based it on that man that asked father to buy a few acres from him, and he answered him that he would want \$50 an acre if he sold it.

Mr. RICHARDSON. That is, your father answered him that way?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. You say you took some hay off lowland on your place?

Mr. ERICKSON. Yes, sir.

Mr. RICHARDSON. Did you cut that hay by hand?

Mr. ERICKSON. Yes, sir; with a scythe.

Mr. RICHARDSON. Have you ever had a mowing machine on that land?

Mr. ERICKSON. No, sir.

Mr. RICHARDSON. It was too wet for that, was it not?

Mr. ERICKSON. No, sir; I could have used a mowing machine, if I had had one, on it.

Mr. RICHARDSON. Whereabouts on the north forty could you have used a mowing machine?

Mr. ERICKSON. Both sides of that ridge running across the forty.

Mr. RICHARDSON. Which one of the three?

Mr. ERICKSON. The long one that runs across the forty.

Mr. RICHARDSON. You mean the north one?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. You poled that hay out and piled it—stacked it on one of the ridges, did you not?

Mr. ERICKSON. I did do that one year; I did that two years. I had a team there and hauled it up on the ridge, and before that we poled it—put a stack wherever it was hauled—any place.

Mr. RICHARDSON. Some years the water was higher on your land than other years, was it not?

Mr. ERICKSON. Oh, water came up a little over the meadows some years and went right back again; it would depend on the rainfall.

Mr. RICHARDSON. You had a dock on the north side of the sill on which your house is built?

Mr. ERICKSON. I got a dock there now.

Mr. RICHARDSON. You had a dock there years ago, did you not?

Mr. ERICKSON. I had a landing place along a creek running up in there.

Mr. RICHARDSON. That was built of logs, was it not?

Mr. ERICKSON. I do not remember. I had logs to walk on and boards and different things, and the high water came, and then we had a dock in the landing place and big gasoline boats running there now, and before that I came up in the creek with a rowboat.

Mr. RICHARDSON. Did not gasoline boats come up to that dock on the north side of the sill that your house is on before the dam was put in?

Mr. ERICKSON. There was no permanent dock then.

Mr. RICHARDSON. But the boats did go up there?

Mr. ERICKSON. No.

Mr. RICHARDSON. Are you sure about that?

Mr. ERICKSON. Rowboats used to come up.

Mr. RICHARDSON. Yes, but did not motorboats go up there?

Mr. ERICKSON. We called it the wet summer; I believe the water for a short time went up, and there might have been a gasoline boat go up then, but it did not, because there was only one gasoline boat on the river.

Mr. RICHARDSON. But it was high enough in 1905 for a gasoline boat to go up to that dock?

Mr. ERICKSON. It might have been for a week or two.

Mr. RICHARDSON. What month?

Mr. ERICKSON. In the last part of July or first part of August.

Mr. RICHARDSON. In what month did this blue joint that you have been telling us about get ready for cutting?

Mr. ERICKSON. In August; in the months of August and September we cut some of it, and we even cut some in the last part of September, and very good hay.

Mr. RICHARDSON. That blue joint is marsh blue joint, is it not?

Mr. ERICKSON. No; we called it blue joint; it is a very good quality of grass and made good hay.

Mr. RICHARDSON. It has to be cut before it is dry, to make good hay, does it not—

Mr. ERICKSON. You can get very good hay—

Mr. RICHARDSON. Can you answer that question?

Mr. ERICKSON. I never cut any after it was dry.

Mr. RICHARDSON. Why not?

Mr. ERICKSON. We cut it before it was dry.

Mr. RICHARDSON. Well, why?

Mr. ERICKSON. I did not need to; I cut my hay before it was dry.

Mr. TAWNEY. I would like to ask you whether any land was sold in the vicinity of your land, or in that neighborhood, in the last three or four years?

Mr. ERICKSON. Yes.

Mr. TAWNEY. What price?

Mr. ERICKSON. A neighbor of mine, Ed Ek, sold his land north of me last summer for \$3,000.

Mr. TAWNEY. How many acres?

Mr. ERICKSON. I do not know how many acres it was.

Mr. MIGNAULT. Any buildings?

Mr. ERICKSON. Kind of house on it.

Mr. MIGNAULT. What kind of house?

Mr. ERICKSON. Frame house.

Mr. MIGNAULT. How much was the house worth?

Mr. ERICKSON. The house was not worth over a couple of hundred dollars.

Mr. TAWNEY. You say it was sold for \$3,000?

Mr. ERICKSON. Yes.

Mr. TAWNEY. How many acres were there?

Mr. ERICKSON. All the land was under water, but I judge it would be probably 75 acres over the water.

Mr. TAWNEY. Cultivated land?

Mr. ERICKSON. No; there was nothing cultivated.

Mr. TAWNEY. Any of it under cultivation?

Mr. ERICKSON. There had been a few acres under cultivation.



Mr. TAWNEY. What was it bought for? Summer resort?

Mr. ERICKSON. Yes. They lay it out in acre lots, and now they are selling them fifty to a hundred dollars an acre.

Mr. TAWNEY. For summer residences?

Mr. ERICKSON. Yes.

Mr. TAWNEY. It was not intended to be used for agricultural purposes?

Mr. ERICKSON. No.

Mr. TAWNEY. Do you know of any agricultural lands sold in that neighborhood recently, and if so, at what price?

Mr. ERICKSON. There was 40 sold a couple of years ago a mile west of my place, somebody told me, for about \$1,300.

Mr. MIGNAULT. Who told you?

Mr. ERICKSON. The man who sold.

Mr. MIGNAULT. Was that sold for summer-resort purposes?

Mr. ERICKSON. No.

Mr. MIGNAULT. What?

Mr. ERICKSON. That was farm land.

Mr. MIGNAULT. It was not sold for the purpose of laying it out in small lots for building lots?

Mr. ERICKSON. No.

Mr. CAMPBELL. How many acres?

Mr. ERICKSON. Forty.

Mr. CAMPBELL. Any buildings?

Mr. ERICKSON. Living house and stable.

Mr. CAMPBELL. Cultivated land?

Mr. ERICKSON. About 5 or 6 acres.

Mr. CAMPBELL. Meadow land?

Mr. ERICKSON. No.

Mr. MIGNAULT. Frame buildings?

Mr. ERICKSON. There was a frame building on it.

Mr. CAMPBELL. Did it front on the lake?

Mr. ERICKSON. No.

Mr. CAMPBELL. Who sold the land?

Mr. ERICKSON. Mr. Bancroft bought it.

Mr. CAMPBELL. He owned it before and he sold it?

Mr. ERICKSON. The owner before was Oscar Douglas.

Mr. CAMPBELL. What is the description? What 40?

Mr. ERICKSON. It is in section 33; I can not give you the description of the 40.

Mr. CAMPBELL. What township and range?

Mr. ERICKSON. Township 71, range 23.

Mr. CAMPBELL. But you can not tell which 40?

Mr. ERICKSON. No.

Mr. TAWNEY. How far was it located from your land?

Mr. ERICKSON. Mile and a quarter by road; in a straight line a mile.

Mr. MIGNAULT. On the road to Ranier?

Mr. ERICKSON. Yes.

Mr. CAMPBELL. Nearer to Ranier than you are?

Mr. ERICKSON. Yes.

Mr. CAMPBELL. Was there cash paid or a trade?

Mr. ERICKSON. I do not know.

Mr. RICHARDSON. Who told you the price?

Mr. ERICKSON. Mr. Bancroft told me himself, and I might be mistaken about it; it might have been over \$1,300, but I remember he said \$1,300.

Mr. CAMPBELL. Does he live out there now or here?

Mr. ERICKSON. He lives in International Falls.

Mr. CAMPBELL. What is his name?

Mr. ERICKSON. Ed Bancroft.

Mr. RICHARDSON. What did he use the property for after he bought it?

Mr. ERICKSON. He had been using it, they have had crops; they have rented it out, and I have seen crops every summer on part of it that was under cultivation.

Mr. RICHARDSON. Did you not go to that house after he bought it?

Mr. ERICKSON. I went by there lots of times.

Mr. RICHARDSON. Did you not go into the house?

Mr. ERICKSON. I do not remember if I was or not. Yes; I think I was in the house.

Mr. RICHARDSON. What was the house used for?

Mr. ERICKSON. Most of the time there was nobody living in the house. He was occupying it himself.

Mr. RICHARDSON. When it was occupied, what was it used for?

Mr. ERICKSON. For a farmhouse to live in. Oscar Douglas lived in that house, him and his family.

Mr. RICHARDSON. I am talking about Bancroft.

Mr. ERICKSON. I do not think he ever lived in it.

Mr. RICHARDSON. Did he rent it to anybody?

Mr. ERICKSON. I do not know whether he did or not.

Mr. RICHARDSON. You said you heard about the Ek place being sold?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. Who told you what was paid for the Ek place?

Mr. ERICKSON. Ed Ek told me himself.

Mr. RICHARDSON. And that is all you know about it?

Mr. ERICKSON. Yes.

Mr. RICHARDSON. You do not know what the payment was made in?

Mr. ERICKSON. No.

Mr. RICHARDSON. Whether it was a trade, or the length of time the purchaser had to make payment?

Mr. ERICKSON. No, sir; he told me he got \$3,000; that is all.

Mr. RICHARDSON. Did you get from your meadow or low land any kind of grass that you cut except blue joint?

Mr. ERICKSON. Oh, along those high ridges running across the meadow, it was, some wild red top we called it.

Mr. RICHARDSON. I asked you about low land. Did you cut anything from the low land except blue joint?

Mr. ERICKSON. Oh, it was mostly blue joint grown on the low land.

Mr. TAWNEY. We have gone over that three times.

Mr. MIGNAULT. We will make every effort to hear all the parties, and we will endeavor to finish to-morrow.

(Adjourned at 10.30 p. m. till 9 a. m. to-morrow.)



INTERNATIONAL FALLS, MINNESOTA,  
*Saturday, January 29, 1916.*

The committee met at 9 o'clock a. m.

MR. TAWNEY. Gentlemen, the committee desires to state at the opening this morning that we have a number of people here who desire to be heard before the hearings close to-night. Some of them are from Fort Frances on the other side of the line and some from the upper shore of the lake. I desire again to emphasize the fact that this is merely for the purpose of obtaining information for the commission to aid us in arriving at a fair conclusion as to the value of the lands that are affected by the regulation of the levels of the Lake of the Woods; it is not the judicial ascertainment or determination of the fact of the value of individual tracts, and the examination of your witnesses will be very materially shortened if the examination is confined to the two primary questions which are involved, namely, the question of the land that is submerged and what is the reasonable value of that land. We trust that you will endeavor, as far as possible, to shorten your examination. We will thus get along faster and be able to hear practically all of the people.

There is some testimony, I understand, that will be offered respecting these values from parties who are not interested—that is, parties who are not owners but who have knowledge of land values. We would like to get all the testimony from both sides if we can while we are here, because it is not at all certain that the commission would be willing to send a committee back here, this being the second time we have been here, and if we can not conclude the hearings this time we may have to adopt some other method of obtaining the desired information. The two Governments are anxious to get our final report as soon as possible, and when the hearing is concluded at Winnipeg the purpose of the commission is then to take up the matter, consider all the questions that are involved in the reference, and present our final report to the two Governments.

I speak of this matter now in order that you may endeavor to limit your examination to those questions that the commission is concerned in. We are not particularly concerned in the reputation of men. We can test the credibility of the witnesses ourselves.

MR. MIGNAULT. I may add that so far as anything in the way of argument is concerned, full opportunity will be given to all parties interested under the reference to present their argument either in the form of briefs or orally to the commission at a future date. What we wish to do and what we came here to do is to listen to the parties who are interested in lands around Rainy Lake and in this district.

MR. SAMUELSON. In answer to the statements just made by the commissioners, I desire to say that Settlers' Exhibit A, which I have introduced, shows the land that these parties own. It also has a tabulated statement made by a competent engineer as to the amount of lands that will be flooded by the raising of these levels, and I will confine the testimony of the men themselves directly to the value of their land.

**TESTIMONY OF GEORGE WATSON, OF ERICKSBURG, MINN.**

GEORGE WATSON, after being duly sworn, testified as follows:

Mr. SAMUELSON. Mr. Watson, you live at Ericksburg?

Mr. WATSON. Yes, sir.

Mr. SAMUELSON. That is your post-office address?

Mr. WATSON. Yes, sir.

Mr. SAMUELSON. You are the owner of part of lot 6 in section 5, and also lot 6 in the southeast quarter of the northwest quarter; the northeast quarter of the southwest quarter; and the northwest quarter of the southeast quarter of section 8, in township 69, range 23?

Mr. WATSON. Yes, sir.

Mr. SAMUELSON. What is the value of that land per acre, Mr. Watson?

Mr. WATSON. \$75 an acre for the land that I have cleared.

Mr. SAMUELSON. How much of the cleared land has been overflowed at the present stage of water?

Mr. WATSON. About 5 acres.

Mr. SAMUELSON. If the waters were raised 2 feet more would there be any more of your cleared land that would be flooded?

Mr. WATSON. Yes; there would be about 10 acres more.

Mr. SAMUELSON. What is the value of the land that is not cleared for cultivation?

Mr. WATSON. \$50 an acre.

Mr. SAMUELSON. You may inquire.

Mr. TAWNEY. Let me ask a few questions. How do you arrive at the value of your cleared land? You named a value of \$75 an acre.

Mr. WATSON. According to what I raise on it.

Mr. TAWNEY. What do you raise on it?

Mr. WATSON. Potatoes, corn, oats, and vegetables of all kinds.

Mr. TAWNEY. It is adapted to garden trucking, is it?

Mr. WATSON. Yes, sir.

Mr. TAWNEY. Where is your market for your products?

Mr. SAMUELSON. International Falls, Ericksburg, and Ray.

Mr. TAWNEY. Do you know of any land in that vicinity that has been sold recently?

Mr. WATSON. No.

Mr. TAWNEY. Do you know of any land that can be bought in that vicinity, or that is for sale?

Mr. WATSON. No.

Mr. TAWNEY. There is no land for sale?

Mr. WATSON. There are no farmers around there that want to sell that I know of.

Mr. TAWNEY. What revenue do you derive from the 5 acres of cleared land?

Mr. WATSON. I have raised as high as 250 bushels of potatoes to the acre and 4 tons of fodder corn on an acre.

Mr. TAWNEY. What did you get a bushel for your potatoes?

Mr. WATSON. \$1.25 a bushel is the price at the present time; 80 cents all fall.

Mr. TAWNEY. How many acres did you say you have in all?

Mr. WATSON. Do you mean cleared?



Mr. TAWNEY. What is the total acreage of the tract of land that you own?

Mr. WATSON. I have 160 acres, with the exception of what the railroad has taken off, that is about 6 acres.

Mr. TAWNEY. How much of it fronts on the water?

Mr. WATSON. Eighty rods across one 40.

Mr. TAWNEY. Is there any bank along that 80 rods?

Mr. WATSON. Yes; just where my house stands.

Mr. TAWNEY. How high is that bank?

Mr. WATSON. It is about 4 feet over the water at the present time.

Mr. SAMUELSON. Did you sell some land to the railroad company?

Mr. WATSON. Yes, sir.

Mr. SAMUELSON. What did you get for that?

Mr. WATSON. Fifty dollars an acre.

Mr. TAWNEY. Was that cleared?

Mr. WATSON. No, sir.

Mr. RICHARDSON. Why is not your cleared land worth \$100 an acre?

Mr. WATSON. It may be. I have refused \$100 an acre for it.

Mr. RICHARDSON. You think it is worth \$100 an acre?

Mr. WATSON. I would not sell it on the river bank for \$100 an acre.

Mr. RICHARDSON. Is your cleared land on the river bank?

Mr. WATSON. Yes, sir.

Mr. RICHARDSON. That is because you would like to be on the lake, is it not?

Mr. WATSON. No; no particular liking for the lake.

Mr. RICHARDSON. Is it because you like to be on the water?

Mr. WATSON. No; it is the most convenient place to build. It is the nearest to the town and the railroad.

Mr. RICHARDSON. Why is not your cleared land worth \$125 an acre?

Mr. WATSON. I do not know. It may be.

Mr. RICHARDSON. Well, is it or not?

Mr. WATSON. Probably.

#### TESTIMONY OF THOMAS WATSON, OF ERICKSBURG, MINN.

THOMAS WATSON, after being duly sworn, testified as follows:

Mr. SAMUELSON. Mr. Watson, you are the owner of lots 1, 5, and 7, and the southwest quarter of the northwest quarter of section 8, township 69, range 23?

Mr. WATSON. Yes, sir.

Mr. TAWNEY. Your land is on the Rat Root River, is it?

Mr. WATSON. Yes, sir.

Mr. TAWNEY. Are you a brother of the previous witness?

Mr. WATSON. Yes, sir.

Mr. TAWNEY. His land is also on the Rat Root River?

Mr. WATSON. Yes, sir.

Mr. SAMUELSON. How much of that land, Mr. Watson, is cleared?

Mr. WATSON. There is somewhere in the neighborhood of 100 acres that is meadow land that I cleared willows off of, big willows.

Mr. SAMUELSON. How much of the land that is under water at this time is under cultivation?

Mr. WATSON. Somewhere in the neighborhood of a couple of acres, I guess.

Mr. SAMUELSON. What is the nature of the rest of the land, that is, the character of it?

Mr. WATSON. Where the timber stands?

Mr. SAMUELSON. Yes.

Mr. WATSON. It is level. It slopes back from the river.

Mr. SAMUELSON. What is the character of the timber?

Mr. WATSON. Poplar and oak and maple.

Mr. SAMUELSON. What kind of soil is it?

Mr. WATSON. Black loam and clay bottom.

Mr. SAMUELSON. What is the value per acre of your cleared land?

Mr. WATSON. Fifty dollars.

Mr. SAMUELSON. What is the value per acre of the land upon which there is now timber?

Mr. WATSON. I judge the whole thing would be about the same price, \$50.

Mr. SAMUELSON. About \$50 an acre?

Mr. WATSON. Yes.

Mr. SAMUELSON. Have you sold any part or portion of that land?

Mr. WATSON. Yes; I sold some to the railroad.

Mr. SAMUELSON. How much land did you sell to the railroad?

Mr. WATSON. Two acres.

Mr. SAMUELSON. At what price?

Mr. WATSON. Seventy-five dollars an acre.

Mr. SAMUELSON. You may inquire.

Mr. MIGNAULT. Was that a voluntary sale or was it by condemnation?

Mr. WATSON. It was a voluntary sale.

Mr. MIGNAULT. Where are those two acres?

Mr. WATSON. The railroad runs right through and cuts off a corner of my land.

Mr. MIGNAULT. How far is it from the river?

Mr. WATSON. About a quarter of a mile.

Mr. MIGNAULT. Is that high land?

Mr. WATSON. Yes.

Mr. TAWNEY. Was it cleared?

Mr. WATSON. No, sir.

Mr. TAWNEY. Do you know of any land having been sold in that vicinity within the last year?

Mr. WATSON. No.

Mr. TAWNEY. Do you know of any that is for sale?

Mr. WATSON. No.

Mr. MIGNAULT. Why do you say your land is worth the figure you mention?

Mr. WATSON. From the location and the figure it would be worth to me for hay and stuff I put on the meadows.

Mr. TAWNEY. As a matter of fact, there is no market for the sale of land there at all, is there?

Mr. WATSON. Not very much that I know of.

Mr. RICHARDSON. You had negotiations with the railway company for the disposal of those two acres and you claimed that the rest of your land was damaged, did you not?

Mr. WATSON. By the railroad company?



Mr. RICHARDSON. Yes.

Mr. WATSON. No.

Mr. RICHARDSON. And you had an allowance made for damage to the rest of the forty?

Mr. WATSON. No, no. They came along and settled it for me. They told me I had 2 acres and asked me what I wanted and gave me a check for it.

Mr. RICHARDSON. The railroad did not damage the rest of the 40 acres at all?

Mr. WATSON. The railroad is a benefit.

Mr. RICHARDSON. Why is not your cleared land worth \$75 an acre?

Mr. WATSON. It might be worth \$100 an acre.

Mr. RICHARDSON. Well, is it worth \$100 an acre?

Mr. WATSON. It might be.

Mr. RICHARDSON. Well, is it?

Mr. WATSON. It might be worth \$100 or \$125 an acre.

Mr. RICHARDSON. Is your land the same kind of land as your brother's, George Watson, Mr. Watson?

Mr. WATSON. Yes, sir; practically it is.

Mr. RICHARDSON. Your land is just as good as his?

Mr. WATSON. Yes, sir; I guess it is.

Mr. RICHARDSON. It is just about the same, is it not?

Mr. WATSON. Yes, sir.

#### TESTIMONY OF MARTIN MATHISON, OF ERICKSBURG, MINN.

MARTIN MATHISON, after being duly sworn, testified as follows:

Mr. TAWNEY. What is your name?

Mr. MATHISON. Martin Mathison.

Mr. TAWNEY. Where is your residence?

Mr. MATHISON. Ericksburg, Minn.

Mr. SAMUELSON. You are the owner of lots 2, 3, and 4 in section 8, township 69, range 23; and also lots 3 and 4 in section 9, township 69, range 23, are you?

Mr. MATHISON. Yes, sir.

Mr. SAMUELSON. How much of your land is under cultivation, Mr. Mathison?

Mr. MATHISON. There is none of it cultivated, but it is natural hay meadow land.

Mr. SAMUELSON. How much of it is natural hay meadow?

Mr. MATHISON. Practically all of it.

Mr. SAMUELSON. What is that portion that is not hay meadow?

Mr. MATHISON. Well, it is the same thing with the exception that a little of it has not been cleaned off.

Mr. SAMUELSON. Some of that is now under water?

Mr. MATHISON. It is all under water now.

Mr. SAMUELSON. What is that land worth per acre?

Mr. MATHISON. It is worth about \$45 or \$50; \$45 as an average, anyway.

Mr. TAWNEY. Mr. Mathison, was this land under water or any part of it under water when you located on it?

Mr. MATHISON. No, sir.

Mr. TAWNEY. When did you locate on it?

Mr. MATHISON. I cut hay on it in 1911.

Mr. TAWNEY. Did you cut hay on it previous to 1911?

Mr. MATHISON. Well, I did not, but hay was cut on it before that.

Mr. TAWNEY. When did you get it?

Mr. MATHISON. I got it in 1913 on the 14th of April, I think it was.

Mr. TAWNEY. Then, you cut hay on it two years before you bought it?

Mr. MATHISON. A year and a half.

Mr. MIGNAULT. When you bought it the water was high?

Mr. MATHISON. Yes, sir; the water was high.

Mr. MIGNAULT. From whom did you buy it?

Mr. MATHISON. From the State.

Mr. TAWNEY. You paid \$5 an acre for it?

Mr. MATHISON. Yes, sir.

Mr. TAWNEY. You cut hay on it in 1911 and you bought it two years afterwards?

Mr. MATHISON. Yes, sir.

Mr. TAWNEY. Why did you buy it if it was under water?

Mr. MATHISON. It was an exceptionally high-water season, and I thought the water would go down again. The water was high that year all over.

Mr. TAWNEY. Did you cut any hay on it in 1912?

Mr. MATHISON. The water went up about haying time, the time I figured on cutting it. I figured on renting from the State. We were renting along the river from the State. But the water rose before the time came to cut.

Mr. TAWNEY. How many acres in all have you?

Mr. MATHISON. 21.45 acres.

Mr. TAWNEY. Do you know of any land owned privately in the vicinity of your land or in that neighborhood that has been sold recently?

Mr. MATHISON. Well, I have not paid much attention. There is land bought and sold now and then, but I never paid much attention.

Mr. TAWNEY. Was this land marshy before you bought it? Was it what we call marsh land?

Mr. MATHISON. Yes; in a way. It is common wild hay.

Mr. TAWNEY. How much did you get for your hay?

Mr. MATHISON. The last that was sold there brought \$10 in the stack. It is close to town.

Mr. TAWNEY. How many tons to the acre did you get?

Mr. MATHISON. I forget. It would average about a ton and a quarter.

Mr. MIGNAULT. That would be \$12.50 an acre that it brought you.

Mr. MATHISON. Yes, sir. It cost about \$3 a ton to put it up. That is how I establish the value on it.

Mr. TAWNEY. You have paid 15 per cent of the purchase price?

Mr. MATHISON. A part of it. All in section 8 I paid cash for and that in section 9 I paid 15 per cent.

Mr. TAWNEY. Is that portion in section 8 under water now?

Mr. MATHISON. Oh, yes.

Mr. RICHARDSON. You bought the hay stumpage from the State in what year?

Mr. MATHISON. I did not buy the hay stumpage from the State. We had an idea that the land belonged to Heinemann, and I paid Mr. Heinemann for the hay on it at the time. I understood that the



river divided his land in front of it. Mr. Watson hired 10 acres and a fraction and paid the State for it. He cut hay on it that same year.

Mr. RICHARDSON. That hay stumpage that belongs to the State sells at \$5 for 40 acres, does it not?

Mr. MATHISON. That I could not say.

Mr. RICHARDSON. Well, that has been the price?

Mr. MATHISON. I guess that has been the usual price.

Mr. RICHARDSON. In what month did the water go up in 1912?

Mr. MATHISON. I could not just recollect, but I know it was when we were cutting hay.

Mr. RICHARDSON. You would not cut hay in May?

Mr. MATHISON. No.

Mr. RICHARDSON. Nor in June?

Mr. MATHISON. No, sir.

Mr. RICHARDSON. Nor in July?

Mr. MATHISON. Well, possibly.

Mr. RICHARDSON. Well, it would be the last of July, would it not?

Mr. MATHISON. I do not know, but I think the water must have gone up possibly about the middle of July—during July, I think.

Mr. RICHARDSON. You think it was July?

Mr. MATHISON. I think so; yes, sir.

Mr. RICHARDSON. Generally you cut hay in August, do you not?

Mr. MATHISON. I guess it would be the proper time, but some hay could be cut during the month of July if it was dry enough.

Mr. RICHARDSON. You bought from the State, you said?

Mr. MATHISON. Yes, sir.

Mr. RICHARDSON. You bought all your land from the State?

Mr. MATHISON. All this land.

Mr. RICHARDSON. I mean all that you have described here.

Mr. MATHISON. Yes, sir.

Mr. RICHARDSON. You bought it all at \$5 an acre, straight?

Mr. MATHISON. Yes, sir.

Mr. RICHARDSON. You bought it at public sale, did you not?

Mr. MATHISON. Yes, sir.

Mr. RICHARDSON. And nobody bid against you?

Mr. MATHISON. No; if they had I would not have had it.

Mr. RICHARDSON. How do you get at the value of \$45 an acre?

Mr. MATHISON. I get at it by what it would cost me to clear that land and put it into hay; and compare that at prices for land that is good for hay at the present time, and then according to how much hay I can cut on the land and what that brings. That is the only way I established the price. I am clearing all land for the purpose of hay. I figure that is worth that much more when it is cut for good hay.

Mr. RICHARDSON. What does it cost you to clear land an acre?

Mr. MATHISON. It will cost us in the neighborhood of \$50 an acre to take the land in timber and clear away the timber and get the stumps out to prepare the soil so as to get the hay cut.

Mr. RICHARDSON. That is up to and including the seeding?

Mr. MATHISON. Yes, sir; the whole thing

Mr. RICHARDSON. It would cost \$50 an acre in timberland?

Mr. MATHISON. In timberland; yes, sir.

MR. RICHARDSON. The other land that is not timberland, what does that cost an acre to clear it?

MR. MATHISON. Well, it varies according to the timber on it. The distance is all the way from natural meadow up to heavy timber.

MR. RICHARDSON. Well, take the average.

MR. MATHISON. The average would be hard to get at.

MR. RICHARDSON. Then, you do not know the cost of clearing an acre, except timber cleared?

MR. MATHISON. If you should show me a certain piece that I am familiar with I would be able to tell the price.

MR. RICHARDSON. Why is not your land worth \$75 an acre?

MR. MATHISON. That is pretty hard to answer.

MR. RICHARDSON. Can you tell me why it is not?

MR. MATHISON. It is not because I figure that I could not get that much out of it. It would not bring me enough to pay the interest on the money and pay that price for it.

MR. RICHARDSON. The hay on that land runs about half a ton to an acre, does it not?

MR. MATHISON. A ton and a quarter is my average when I cut the hay on it.

MR. RICHARDSON. How do you get at a ton of hay?

MR. MATHISON. We average that in various ways. I have cut hay for years, and if I see a field of hay I will have to judge it one way or the other unless I cut it and measure it.

MR. RICHARDSON. In measuring it, do you measure it in the stack?

MR. MATHISON. Sometimes it is measured in the stack.

MR. RICHARDSON. I am talking about your getting at a ton and a quarter of hay.

MR. MATHISON. It was just what I suggested it was.

MR. TAWNEY. That is your estimate?

MR. MATHISON. That is my estimate; yes, sir.

MR. RICHARDSON. Can you look at a piece of land and say that there is just exactly an acre in that piece? Have you an eye like that?

MR. MATHISON. Do you mean the size of the piece?

MR. RICHARDSON. Yes.

MR. MATHISON. No, sir; I could not.

MR. RICHARDSON. Did you ever have an acre measured by a surveyor or engineer and then take the hay off of it and find out how many tons came from it?

MR. MATHISON. No, sir; I have not.

MR. RICHARDSON. That is, in getting at a ton and a quarter you guess at what is a ton and you guess at what is a quarter?

MR. MATHISON. Well, I have cut hay on larger tracts for years; put it up, and know exactly what it brought, so I have a little experience in cutting hay, and I cut this hay myself. That is the only estimate.

MR. RICHARDSON. A stand of hay does not run the same each season?

MR. MATHISON. No, sir; it does not.

MR. RICHARDSON. Sometimes it is more sparse, and sometimes it is higher and heavier?

MR. MATHISON. Yes, sir. I am only judging this from the time I did cut this piece.



Mr. RICHARDSON. You are judging it from 1911?

Mr. MATHISON. Yes, sir.

Mr. RICHARDSON. You go back four years and think now that back there in 1911 you got a ton and a quarter from an acre?

Mr. MATHISON. Well, that is about what I had at the time; yes, sir.

Mr. RICHARDSON. That is why you make this statement to the committee?

Mr. MATHISON. Yes, sir; it is all based on that.

### TESTIMONY OF FREDERICK HEINEMANN, OF INTERNATIONAL FALLS, MINN.

FREDERICK HEINEMANN, after being duly sworn, testified as follows:

Mr. TAWNEY. What is your full name?

Mr. HEINEMANN. Frederick Heinemann.

Mr. TAWNEY. What is your residence?

Mr. HEINEMANN. My residence at present is in the city of International Falls.

Mr. SAMUELSON. Mr. Heinemann, you are the owner of lots 7, 9, and 10 in section 5, township 69, range 23; and also lots 9, 10, and 13 in section 4, township 69, range 23?

Mr. HEINEMANN. Yes, sir.

Mr. TAWNEY. That land is located on the Rat Root River, is it?

Mr. HEINEMANN. Yes, sir.

Mr. SAMUELSON. You took that land as a homestead, Mr. Heinemann?

Mr. HEINEMANN. Yes, sir; I did, in February—I do not remember the exact date—1902.

Mr. SAMUELSON. What is the character of that land?

Mr. HEINEMANN. It is about half natural meadow and the rest timberland.

Mr. SAMUELSON. What kind of soil is there on that land?

Mr. HEINEMANN. The soil differs. In the high land it is sandy loam. I mean in the highest land that I have, the place where my house stands. It is very high there, the bank being about 25 feet, and it is a very healthy place. That is the reason I built my house there. The meadow land is black loam and clay bottom. That is the run of the land, and, of course, I had pine down on the ridge between the meadows. It rises a trifle there and there has been quite a bunch of white and clear pine standing there.

Mr. TAWNEY. The soil is sandy where the pine was?

Mr. HEINEMANN. Yes, sir; the soil is sandy there. I had to cut this pine last winter so I could get something out of it. The pines were dying—they were mostly half dead. There were some large pines among them. You know there is no pine growing in a swamp land where the soil is destroyed by the water. I have also oak standing there of the same size. Now, it takes many years to grow an oak to that size. I have the same large size elm in there; I would not say very many, but there are many small ones. They are all dead now.

Mr. MIGNAULT. How high is that land?

Mr. HEINEMANN. It is above high-water mark; I mean the Government meander stage. I have seen the water a full foot lower there.

Mr. MIGNAULT. But your elms are on high land, are they not?

Mr. HEINEMANN. High land, of course. I have only a very small portion of that where the water does not affect it. I know that there are very large chunks breaking off the river bank where the water is rising so high. Very large chunks fall into the river.

Mr. SAMUELSON. How much of that is meadow land?

Mr. HEINEMANN. I believe that it is very close to seventy some acres.

Mr. TAWNEY. What is the total acreage?

Mr. HEINEMANN. The total acreage is about 150 flooded.

Mr. MIGNAULT. You say there are 150 acres flooded?

Mr. HEINEMANN. Very close to it if not more—timberland as well as meadow land. In the summer time everything is green and this timber is all dead. There are no more leaves to be seen on it. The woodpeckers are on it now.

Mr. SAMUELSON. If the water were raised 2 feet above where it is at the present time, Mr. Heinemann, how would it affect what you have left?

Mr. HEINEMANN. There would be a very small acreage left. I believe there would be somewhere about 5 acres left.

Mr. SAMUELSON. That is out of the original 160 acres?

Mr. HEINEMANN. Yes. There would be sufficient space to raise a few bushels of potatoes and have my house dry. I do not think it would ever reach there, unless the water should break those river banks away more than it has done so far.

Mr. SAMUELSON. What is that land worth an acre, Mr. Heinemann?

Mr. HEINEMANN. On account of the location, on a very close market for hay, I should think it would be worth about \$40 an acre.

Mr. MIGNAULT. The meadowland?

Mr. HEINEMANN. The meadowland and high land and mixed. Of course, there is land which I have cleared perfectly. That cost me, with my own work and help I had, \$65 an acre.

Mr. MIGNAULT. How many acres?

Mr. HEINEMANN. About 4 acres.

Mr. MIGNAULT. You mean there are 4 acres that you have cleared?

Mr. HEINEMANN. Totally cleared. There are no stumps in it. The stumps are entirely taken out and the land is fit for the cultivator. It is a light soil—a sandy loam.

Mr. MIGNAULT. That land is not affected?

Mr. HEINEMANN. No, it is not. I will show you a photograph of my house which I have built on my place, if you gentlemen wish to see it. You will see the barn in the rear which is larger than the house.

Mr. MIGNAULT. How far are you from the river?

Mr. HEINEMANN. The whole land is river frontage. This house is about 30 feet from the river bank.

Mr. TAWNEY. Do you live there in the summer time?

Mr. HEINEMANN. I do at times. I go out there to see it. Of course, I have it rented at the present time to a friend of mine. I intend to make it my home.



Mr. TAWNEY. You have a motor boat for use in going back and forth, I suppose?

Mr. HEINEMANN. No; I have not. I used to have rowboats, and that is the way we got our provisions in larger quantities. Another neighbor of ours had a sailboat. We went in and got supplies together, so we did not have to carry them all the time. Carrying 75 or 80 pounds on your back for 24 miles is no pleasure. I have done that many times.

Mr. MIGNAULT. Are there any roads there?

Mr. HEINEMANN. There is now, but at that time there were no roads. The roads are getting to be more and more improved. In these days I walked up to my knees in muskeg to get to the place.

Mr. TAWNEY. You have owned this land since 1902?

Mr. HEINEMANN. Since 1902. I went on it March 1.

Mr. TAWNEY. Was the meadow land in 1902 and up to 1911 covered with water?

Mr. HEINEMANN. It was in some springs. When we had any heavy snow, like this year, and it went out very suddenly the water went over some portions of it and stayed there for a certain length of time until the lake took it away gradually again. It is just like you would have a cyclone in some rivers—it stuck there for some time because the water came on from all directions.

Mr. MIGNAULT. How long was the land covered with water?

Mr. HEINEMANN. Sometimes for a month or more.

Mr. MIGNAULT. In what part of the year was it—what month?

Mr. HEINEMANN. In the spring of the year—in May or June and sometimes in July it was flooded—but the water went off in very good season to cut our hay. The hay seemed to be so much richer when we had those years to get this overflowage. We had hay there that we could not see our heads above.

Mr. SAMUELSON. Mr. Heinemann, about what time do you have spring in this community?

Mr. HEINEMANN. It is very irregular here. We sometimes drive logs here the 1st of April and sometimes in May and June. Sometimes we have no chance to drive them at all—we do not have water enough to flood them from away back from the upper end of the river.

Mr. MIGNAULT. When does the ice go out?

Mr. HEINEMANN. That is very uncertain, too. The ice in the lake here generally goes out in May. The ice in Rainy Lake and the river goes out a trifle earlier.

Mr. SAMUELSON. About what time of the year does the larger portion of the water that comes from the melting snow and ice in the woods reach the lake?

Mr. HEINEMANN. That strikes it according to what time the ice gets out of the river. It is irregular. That is why I say that sometimes we have it standing longer on the meadow than at other times.

Mr. SAMUELSON. You say that the ice goes out of Rainy Lake in the month of May sometimes?

Mr. HEINEMANN. In the month of May; yes.

Mr. TAWNEY. What do you get for your hay?

Mr. HEINEMANN. I sold hay standing in the stack on the ground for about \$10 a ton.

Mr. TAWNEY. Is that the average price?

Mr. HEINEMANN. That is the average price on the meadow.

Mr. TAWNEY. To whom do you sell mostly, loggers?

Mr. HEINEMANN. There have been a good many people around there doing logging, but now we have an outside market. We have the railroad and good facilities for shipping it. We did not have very much sale for it before the railroad came in. We had nothing but home sales. Some people did not have any meadow at all.

Mr. TAWNEY. What do you estimate as the production of hay per acre?

Mr. HEINEMANN. It runs from about a ton and a half to three tons per acre. It depends on where it stands and what kind of hay it is.

Mr. RICHARDSON. You have never measured an acre of land and then measured the hay taken from it, have you, Mr. Heinemann?

Mr. HEINEMANN. I have as far as the plats tell us how many acres I have on my lots. That is the way I found how many acres I have.

Mr. RICHARDSON. What description did you include in that?

Mr. HEINEMANN. The description of the plat.

Mr. RICHARDSON. Give me the description.

Mr. HEINEMANN. I have not got the plat here. It would probably say on the plat how many acres there are there.

Mr. RICHARDSON. I am not asking you for the number of acres. I understood you to say you took all the pieces and then figured out all the hay.

Mr. HEINEMANN. No; I figured just from every lot where I cut.

Mr. RICHARDSON. From each lot?

Mr. HEINEMANN. Because it was not a square piece where I cut. There were creeks running through it and I could not figure it that way.

Mr. RICHARDSON. How many of your lots have creeks running through them?

Mr. HEINEMANN. There are two creeks running through. I believe there is one in five and one in four. That is branch land.

Mr. RICHARDSON. How did you arrive at your estimate of 3 tons of hay per acre?

Mr. HEINEMANN. Three tons to the acre is where it yields the heaviest.

Mr. RICHARDSON. Do you mean on a full acre?

Mr. HEINEMANN. On a full acre; yes.

Mr. RICHARDSON. On not more than one acre?

Mr. HEINEMANN. Well, I would not exactly say just one acre at a certain spot, but it is in some places where I get that out of it, Mr. Richardson.

Mr. RICHARDSON. But not every season?

Mr. HEINEMANN. In places I do get that amount at any time of the year when the water is off; yes.

Mr. RICHARDSON. Whether the water is high or low?

Mr. HEINEMANN. We have not had any real low water. We had always enough moisture there to raise that on some places of the meadow.

Mr. RICHARDSON. You are a tailor, are you not?

Mr. HEINEMANN. I am doing tailoring at the present time.

Mr. RICHARDSON. Here in International Falls?



Mr. HEINEMANN. In International Falls; yes, sir.

Mr. TAWNEY. Do you know of any land that has been sold in the vicinity of your place recently, Mr. Heinemann?

Mr. HEINEMANN. No; I do not.

Mr. TAWNEY. Do you know of any that has been offered for sale?

Mr. HEINEMANN. No.

Mr. MIGNAULT. How did you buy it?

Mr. HEINEMANN. I filed and got it from the Government; I homesteaded.

Mr. RICHARDSON. How do you arrive at your price of \$40 an acre?

Mr. HEINEMANN. Well, it is worth that to me because the location is excellent. At one place there were beautiful oaks and elms standing, and they are standing yet, but they are dry, and it would have made a very nice park for picnic grounds, etc. In former years people went over there from Ericksburg and picnicked, but it is all under water now. It was really the best place they had. I had it cleared up and left some of the oaks and elms standing.

Mr. MIGNAULT. That is on the high ground?

Mr. HEINEMANN. Well, it used to be all high ground—way above high-water mark—but it is under water to-day.

Mr. RICHARDSON. It is under water where those elms are?

Mr. HEINEMANN. Yes.

Mr. RICHARDSON. By "to-day" do you mean this month?

Mr. HEINEMANN. To-day there is ice on it; yes.

Mr. RICHARDSON. When were you out there last?

Mr. HEINEMANN. I was out there some time this fall when it was frozen up. The ice is there now and was there when I went out there.

Mr. RICHARDSON. You have not been out there since when?

Mr. HEINEMANN. I have not been out there since last fall some time. I do not remember the date.

Mr. RICHARDSON. Do you mean in November?

Mr. HEINEMANN. It was before that. I believe it was in October some time.

Mr. RICHARDSON. What part of October?

Mr. HEINEMANN. In the latter part of it.

Mr. RICHARDSON. And there was ice on the land at that time?

Mr. HEINEMANN. There was some ice on it then; yes. I understood from my neighbors there that it froze up that way.

Mr. RICHARDSON. That is something that somebody told you?

Mr. HEINEMANN. Well, the water stood that high, and it is that way to-day. I have not been out there since, but that timber has been dry for several years.

Mr. RICHARDSON. How did you arrive at the cost of \$65 an acre to clear the land?

Mr. HEINEMANN. I paid a man \$35 a month and board, and I worked at it myself, and I figured my half just as much.

Mr. RICHARDSON. \$35 a month each?

Mr. HEINEMANN. Yes, sir. Those were heavy stumps, and the only way we could do was to grub them out with a grubbing hoe and an ax. We did not do any blasting. It was too expensive in those days. I guess it is expensive to-day.

Mr. RICHARDSON. You say there are some roads out there?

Mr. HEINEMANN. There are; yes.

Mr. RICHARDSON. Where is the road with reference to your place?

Mr. HEINEMANN. The excellent roads are across the river, but I can drive along the river bank to the late built bridge on the section line connecting with Ericksburg.

Mr. RICHARDSON. How far is it from your house to the bridge?

Mr. HEINEMANN. It is about half of a 40.

Mr. RICHARDSON. And the road is on the other side of the river from your land?

Mr. HEINEMANN. There is a public road on one-half of the 40 toward the bridge. There is a road going to International Falls and to Ericksburg. The bridge is right there on that point connecting those two roads. The State ditch runs right by there, and that is what makes our road there. There is a fairly good road there. It is really better than the county road. It is drier in the summer time

Mr. RICHARDSON. The State put a ditch through there?

Mr. HEINEMANN. Yes; it did.

Mr. RICHARDSON. In what year was that ditch put there?

Mr. HEINEMANN. I believe it was last fall a year ago.

Mr. RICHARDSON. Was not that a county ditch?

Mr. HEINEMANN. It is a judicial ditch. The big dredges were working on it.

Mr. RICHARDSON. You do not know whether it is a State ditch or a county ditch or a judicial ditch, do you?

Mr. HEINEMANN. I would not say for sure, but I think it is a judicial ditch.

Mr. RICHARDSON. How long is that ditch?

Mr. HEINEMANN. It unites with the main ditch over in Main Muskeg going east.

Mr. RICHARDSON. How many miles?

Mr. HEINEMANN. I do not recollect.

Mr. RICHARDSON. How wide is the ditch?

Mr. HEINEMANN. I do not know exactly how wide it is, but I guess it states the width in some of the records. It was built by a large dredge.

Mr. RICHARDSON. How far is that ditch from your land?

Mr. HEINEMANN. It is between five and six.

Mr. RICHARDSON. Between five and six what?

Mr. HEINEMANN. Sections 5 and 6; the division of those two.

Mr. RICHARDSON. What is the depth of that ditch?

Mr. HEINEMANN. I do not know. I have never measured it. It is full of water. It is flooding even on places over the soil.

Mr. RICHARDSON. You mean that it was full of water when?

Mr. HEINEMANN. At most any time right by the river, because it is backing in from the river.

Mr. RICHARDSON. The water backs up from the river into the ditch?

Mr. HEINEMANN. Into the ditch; yes.

Mr. TAWNEY. You say that that ditch was completed a year ago last fall?

Mr. HEINEMANN. Yes.

Mr. TAWNEY. That was the fall of 1914?

Mr. HEINEMANN. Yes; that is what I think it was. I would not say positively that it was in the fall or later, but I think they had



to stop on account of the freezing up of the ditch for a short distance, and they did not finish it.

Mr. TAWNEY. The ditch empties into Rat Root River?

Mr. HEINEMANN. It empties into the Rat Root River; yes.

Mr. TAWNEY. If the water was so high, how did they build the ditch?

Mr. HEINEMANN. It is higher in the muskeg than where it unites with the main ditch going east.

Mr. TAWNEY. I mean the mouth of the ditch where it empties into the Rat Root River. If the water were so high in the river, how did they dig the ditch?

Mr. HEINEMANN. They dug the ditch, but the only thing was they found that it froze up on them in the fall and they couldn't finish it.

Mr. RICHARDSON. Was the ditch ever finished?

Mr. HEINEMANN. Yes; the ditch is dug through, I believe.

Mr. TAWNEY. Did they finish that ditch with a floating dredge?

Mr. HEINEMANN. I believe it was a floating dredge. I know it was on another ditch running through my land on a line between sections 5 and 4. I have a ditch running through there.

Mr. TAWNEY. How does it happen that it would empty into the water that was above the level of the ditch; and if it did, is the land along the ditch submerged by the water coming down or submerged by the water backing up?

Mr. HEINEMANN. It is submerged by the water backing up from the river. My neighbor has some damage there where that ditch is running into the river.

Mr. MIGNAULT. When did they begin building the ditch?

Mr. HEINEMANN. They began in 1914.

Mr. MIGNAULT. The water was then high?

Mr. HEINEMANN. Oh, yes.

Mr. MIGNAULT. The outlet of the ditch is in the Rat Root River?

Mr. HEINEMANN. It is in the Rat Root River; yes, sir.

Mr. MIGNAULT. They did not provide for sufficient fall to dispose of the water from the ditch?

Mr. HEINEMANN. It is on the section line and they just took that line to get the ditch through to the Rat Root River. In fact, the land was on the high-water mark there, not above, but right by the river bank; so the land was overflowed before the ditch ever came there.

Mr. MIGNAULT. Do you remember what engineer was in charge of the building of that ditch?

Mr. HEINEMANN. I do not. There are some other parties here who could probably tell you more about it. Probably Mr. Mathison could.

Mr. BERKMAN. Mr. Commissioner, I think that Mr. Meyer could explain to the commission how these ditches are dug; that is, that they are commenced in an upper country and they come down with the water. The projects are not started from the level of the water in which they empty, but they are started above. They come down and they dispose of them by the best means possible.

Mr. MIGNAULT. That is a mistake, though.

Mr. BERKMAN. Well, that is the only way, and I think Mr. Meyer can explain that that is the only way it would be possible to drain in a country where it is necessary to take the water from a high point and empty it into a low point.

Mr. TAWNEY. That is one of the questions that the commission will consider at Winnipeg, and we can ask Mr. Meyer for an explanation there as to this and all other ditches along there. The whole ditch question is coming up at Winnipeg. The counties of Beltrami and Roseau have asked to be heard on the question of ditches on the Lake of the Woods when the commission holds its hearings at Winnipeg; so it is not necessary to take up time now by having Mr. Meyer explain the matter. You may proceed, Mr. Richardson.

Mr. RICHARDSON. This ditch between sections 5 and 6 is on the west side of your land, is it?

Mr. HEINEMANN. It is.

Mr. RICHARDSON. Where is the other ditch?

Mr. HEINEMANN. The other ditch is between sections 5 and 4 on the east.

Mr. RICHARDSON. On the east side?

Mr. HEINEMANN. Yes.

Mr. RICHARDSON. Into what does the ditch between sections 5 and 4 empty?

Mr. HEINEMANN. Into the Rat Root River, the same as the ditch between sections 5 and 6.

Mr. RICHARDSON. Those two ditches are just a mile apart, are they?

Mr. HEINEMANN. I believe so.

Mr. RICHARDSON. Are they about the same size?

Mr. HEINEMANN. Yes; I should judge they are.

Mr. RICHARDSON. Were they put in at the same time?

Mr. HEINEMANN. I was out there at the time they took the dredge out last Christmas a year ago. I was out there when they chopped it out of the ice.

Mr. RICHARDSON. That was Christmas of 1914?

Mr. HEINEMANN. Christmas of 1914.

Mr. RICHARDSON. Did the same men put in that ditch who put in the other ditch?

Mr. HEINEMANN. I do not know.

Mr. RICHARDSON. Do you know whether that ditch was put in in the same proceedings or not?

Mr. HEINEMANN. I do not.

Mr. RICHARDSON. Did you get an assessment on your land on account of those ditches?

Mr. HEINEMANN. I did.

Mr. RICHARDSON. On both of them, did you?

Mr. HEINEMANN. No; I do not think I did on both of them. I just got it on the lower one.

Mr. RICHARDSON. What do you mean by the lower one?

Mr. HEINEMANN. The one between sections 5 and 4, on the east side.

Mr. RICHARDSON. What do you mean by an assessment?

Mr. HEINEMANN. Well, I am assessed for the ditch coming through there. I protested against it, but I could not get any relief.

Mr. ROCKWOOD. You mean that you have to help pay for it?

Mr. HEINEMANN. Yes; that is the idea.

Mr. RICHARDSON. They assessed your land as being benefited by that ditch?

Mr. HEINEMANN. I do not know whether they did or not.



Mr. RICHARDSON. Well, was not that the reason you protested?

Mr. HEINEMANN. I haven't any benefit from it. It is a damage to me.

Mr. RICHARDSON. And you have to pay for that damage?

Mr. HEINEMANN. Certainly.

Mr. BERKMAN. That is true in many cases. The Circuit Court of Minnesota has said that it is for the benefit of public health and for that reason you have to come across.

Mr. RICHARDSON. Were you not present at a hearing held here in the courthouse?

Mr. HEINEMANN. I was. I have been to Mr. Staunton.

Mr. RICHARDSON. You mean Judge Staunton?

Mr. HEINEMANN. To Judge Staunton; yes, sir.

Mr. RICHARDSON. You were present here at a meeting in the courthouse, and you heard men testify here that that ditch was going to benefit your land, did you not?

Mr. HEINEMANN. I have not had any such talk.

Mr. RICHARDSON. You protested that it was not going to benefit your land, did you not?

Mr. HEINEMANN. No; I have not had any talk of that kind whatever. I just spoke to Judge Staunton personally and another attorney in here. There wasn't any court proceedings of that kind. There were some people here who were looking for damage recovery.

Mr. RICHARDSON. You mean, then, that you merely protested with words. You did not write anything?

Mr. HEINEMANN. That is all; words.

Mr. RICHARDSON. You did not file any written protest in the proceedings?

Mr. HEINEMANN. No, sir.

Mr. MIGNAULT. In other words, you did not contest the assessment?

Mr. HEINEMANN. No; I did not. I was not supposed to be at that meeting. I just went specially to see Judge Staunton because our county commissioners referred me to him and told me at what date Judge Staunton would be here presiding over some other cases. I couldn't get any satisfaction anywhere. My taxes are very high and I have only a few acres out of water; so I tried to get my taxes lowered in some way. I have tax receipts in my pocket showing that I paid over \$54 a year taxes on this drowned land; and if you folks wish to see them I can produce them. I protested for years. Here is one of the tax receipts.

Mr. TAWNEY. What do these receipts show as to the aggregate taxes paid in the year 1914?

Mr. HEINEMANN. It is paid in two payments. You can see that it is \$27.17. That is half of the amount.

Mr. TAWNEY. The annual tax?

Mr. HEINEMANN. Yes.

Mr. TAWNEY. So the aggregate tax is twice \$27.17?

Mr. HEINEMANN. Yes.

Mr. MIGNAULT. What is the assessed value?

Mr. HEINEMANN. These receipts do not give the assessed value.

Mr. TAWNEY. Do you know what the rate of taxation is in this county?

Mr. HEINEMANN. No; I do not.

Mr. SAMUELSON. It is 60 mills.

Mr. ROCKWOOD. That would be, then, a valuation of \$900 on the whole property.

Mr. HEINEMANN. That assessed value is about 40 per cent.

Mr. TAWNEY. Under the present law are they not required to assess at 50 per cent?

Mr. ROCKWOOD. No, sir; 40 per cent.

Mr. RICHARDSON. They take the full value and assess only 40 per cent of it. There is a different valuation on the buildings.

Mr. TAWNEY. What is it on the buildings?

Mr. SAMUELSON. Fifty per cent.

Mr. MIGNAULT. Your property, Mr. Heinemann, is rented, you say?

Mr. HEINEMANN. It is rented, but the party just now is not able to pay any rent. It is rented at \$8 a month, but I have not received any rent since April.

Mr. MIGNAULT. How long has it been rented?

Mr. HEINEMANN. It has been rented since last fall a year ago.

### TESTIMONY OF LOUIS OGAARD.

LOUIS A. OGAARD, having been duly sworn, testified as follows:

Mr. SAMUELSON. You and Mr. F. H. Clarke are the owners of lot 5, in section 28, township 71, range 23, and lot 3 in section 29, township 71, range 23?

Mr. OGAARD. Yes.

Mr. SAMUELSON. And you personally are the owner of lot 4, in section 29, township 71, range 23?

Mr. OGAARD. Yes.

Mr. SAMUELSON. How long have you resided in this part of the country?

Mr. OGAARD. Twenty-two years the next 6th April since I came here.

Mr. SAMUELSON. And what is your business and profession?

Mr. OGAARD. Surveying.

Mr. SAMUELSON. And how long have you followed that profession?

Mr. OGAARD. For about 30 years.

Mr. SAMUELSON. Graduated from what college?

Mr. OGAARD. From the Military Academy; and I took some practice work in Minnesota.

Mr. SAMUELSON. Have you surveyed, as deputy United States surveyor, some of these lands in this county?

Mr. OGAARD. I have.

Mr. SAMUELSON. If you could call to mind, what part of the territory did you survey as such deputy United States surveyor?

Mr. OGAARD. About the north half of Koochiching County; that is, the east side of Big Fort River.

Mr. SAMUELSON. Did you survey any of the lands adjacent to Rainy River, Rainy Lake, Rat Root Lake, or Black Bay?

Mr. OGAARD. Yes, I surveyed township 69, range 23, the one you have examined the witnesses about. I surveyed the township referred to by the last witness, 69, range 23, also 70, range 23, and 70, range 24; that borders on the Rainy River.



Mr. SAMUELSON. In the making of those original surveys, where the lands bordered upon the lakes or rivers, did you also establish the meander corners?

Mr. OGAARD. Yes, sir.

Mr. SAMUELSON. In these townships that you have just mentioned bordering on the lakes and rivers referred to, at what point were the meander corners established?

Mr. OGAARD. AS near as we could tell, at the average high water mark, according to the instructions received from the surveyor general.

Mr. SAMUELSON. And where were those meander corners located with reference to the demarcation between vegetation and non-vegetation?

Mr. OGAARD. Oh, when you get out of the timber, where you can see there is no timber growing, you generally consider that high water mark; that is along all the rivers and streams here.

Mr. SAMUELSON. Take lot number 5, in section 28, township 71, range 23; where is that located with reference to the lake?

Mr. OGAARD. It is on the south side of the lake.

Mr. TAWNEY. Which lake?

Mr. OGAARD. Rainy Lake.

Mr. SAMUELSON. Lot 3, in section 29, township 71, range 23?

Mr. OGAARD. It is just adjoining this lot; we have a string of lots along the lake.

Mr. SAMUELSON. And lot 4 in 29 adjoins lot 3?

Mr. OGAARD. Yes.

Mr. SAMUELSON. Prior to the raising of the waters were those lots fairly high land?

Mr. OGAARD. There are some small tracts of land on lot 3 and also on lot 4 that were under water; that is at a high stage of water during the month of June and the first of the month of July, the water would generally recede so you could cut hay on the meadow lands.

Mr. SAMUELSON. In your twenty-odd years experience in this country, what time have you noticed that the ice would go out of Rainy Lake, for instance? What month?

Mr. OGAARD. Navigation would generally open about the 10th of May; of course that will vary; the ice may go out a little earlier or a little later, but roundabout the 10th of May the steamboats used to go over the Kettle Falls.

Mr. SAMUELSON. And at what time in the spring of the year would the natural rise of water come from the melting snow?

Mr. OGAARD. At the first the natural rise of water in the river in the early part of May on the watershed of Rainy Lake and tributaries is so large that the rise of the waters in Rainy Lake would not be noticeable very much before the middle, or say the latter part of June, it takes so long before that is filled up.

Mr. SAMUELSON. With regard to these lots that you have reference to, what is their condition at the present time?

Mr. OGAARD. Those low lots I refer to there are all under water.

Mr. TAWNEY. The year round?

Mr. OGAARD. Yes, the year round.

Mr. TAWNEY. About what is the area of the land under water the year round?

Mr. OGAARD. On lot 4—I know that myself—it is about 5 acres that is submerged, but about 5 acres more that is low, and the water goes right through there; so it is next to practically worthless.

Mr. SAMUELSON. About 10 acres on lot 4?

Mr. OGAARD. Yes. If you will excuse me, I would like to explain that a little. I have a summer home; that is, we live up there in the summer on lot 4. I built a cottage down there on the point, and the rushing of the water is washing that bank away, and unless something is done I won't have any house or home at all, because the water during the last couple of years has washed about 20 feet, and I only have about 90 feet to the lake now, and unless something is done I will have to move off.

Mr. MIGNAULT. You have not attempted to protect the bank?

Mr. OGAARD. A year ago this last fall I did attempt to haul in rocks and put \$60 worth of rock round the top of that point, and that was better. It did not come in much this fall, and I had a lumberman working for me last summer, and he said he could fix it. There was lots of logs lying around the shore, and he rolled those up and drew stakes out, but when the fall winds came from the northwest it took that whole business away and more of the shore with it.

Mr. SAMUELSON. What is the value of your cottage there?

Mr. OGAARD. I paid Mr. Stube \$576 for the cottage, and later on I paid him \$100 for building an ice house right behind the cottage.

Mr. SAMUELSON. If these waters were raised 2 feet more, would that wipe out your entire cottage, ice house, and everything?

Mr. OGAARD. It would go to the ice house, but not to the cottage, because that is a little higher there, and the engineers will know that; they had their camp right by my cottage; there is a little knoll right out there.

Mr. SAMUELSON. What is the condition of lots 4 in 29 and 5 in 28?

Mr. OGAARD. They are in the same condition there, and on lot 4 I would explain that there has no improvement been made on those two lots.

Mr. SAMUELSON. What did you use those lots for prior to the time that they became covered with the water?

Mr. OGAARD. I did not use them for very much. I had lot 4 cleared. I paid \$30 an acre to have the timber cut and removed—that is, burned, whatever was not cut into wood; and two years ago I had two men picking up rubbish and cleaning it up. I think that probably the improvements I put on that land—that is, in clearing and so on—would amount to about \$50 an acre—that is in a rough state.

Mr. SAMUELSON. Did you utilize that land for any agricultural purposes, like the raising of hay or anything of that kind?

Mr. OGAARD. I have; yes. I have about 7 acres plowed, under cultivation. I raised on that last year; I had about 2 acres potatoes and about the same amount of barley and oats. We had about, oh, probably a tenth or so of an acre of corn, besides all kinds of garden truck.

Mr. TAWNEY. That was last year?

Mr. OGAARD. Yes.

Mr. TAWNEY. What did that wood you took off the land that cost you \$50 an acre to clear yield you?



Mr. OGAARD. It did not yield me anything practically. A man up in Ranier gave me \$5 to take all the wood that was practically worth anything.

Mr. TAWNEY. Did he cut it himself?

Mr. OGAARD. Yes; and removed it.

Mr. TAWNEY. You got the \$5 for letting him cut it and take it away?

Mr. OGAARD. Yes.

Mr. SAMUELSON. How much of lot 5 in 29 and lot 3 in 29 are now overflowed?

Mr. OGAARD. I could not say; I have not examined that closely; I would not be able to state.

Mr. SAMUELSON. What is that land in those lots worth?

Mr. OGAARD. If you will allow me to explain before I state those figures, I will give you what it is practically worth: Six years ago Clarke and I and Beddel owned lot 3, section 30; that is bordering on the lake; we sold that to the Virginia & Rainy Lake Railroad for \$150 an acre; that is within half a mile of lot 4.

Mr. MIGNAULT. How many acres?

Mr. OGAARD. I think that was 35 acres in that particular lot.

Mr. MIGNAULT. There was a right of way across his property, was there?

Mr. OGAARD. No; we sold the whole lot.

Mr. TAWNEY. To the railroad company?

Mr. OGAARD. Yes, and last summer I sold two 10-acre tracts—that is southwest of lot No. 4—to James Brennan over in Ranier. I sold him a 10-acre tract first for \$100 an acre, payable in three annual payments, and later, after he had cleared part of that, he wanted 10 acres more, and I cut off 10 per cent and sold him that for \$90 an acre in cash.

Mr. TAWNEY. What did he buy it for?

Mr. OGAARD. He bought it from me.

Mr. TAWNEY. What for?

Mr. OGAARD. For farming purposes; he has cleared up about 8 or 9 acres of it all ready for cultivation.

Mr. TAWNEY. Are there any roads there?

Mr. OGAARD. Yes, it has a good road running between those lots and a portage back.

Mr. TAWNEY. Is there not good agricultural land in this county that you can buy for less than \$90 an acre?

Mr. OGAARD. Why, certainly there is; the reason he wanted that, it is within half a mile of his home at Ranier, and he wanted it for garden, and especially for strawberries; it is a sandy loam, and it lays very nicely overlooking the lake.

Mr. MIGNAULT. Is that highland?

Mr. OGAARD. Yes, that is all highland.

Mr. MIGNAULT. About how high?

Mr. OGAARD. It is about 10 feet, or from 10 on the front end there to about 25 on the rear end going back; it slants gradually, you know, and if I consider that land on lot 4 at the same price as we got from the Virginia Lumber Co., or from the other company, \$150 plus \$50, the improvements I put on it, it would be

worth \$200 an acre. Of course I did not clear that land with the idea of selling it, because I wanted a home, and I was disappointed.

Mr. MIGNAULT. How much do you say the land that is flooded is worth?

Mr. OGAARD. Well, with the improvements I put on it, it would be worth \$200 an acre.

Mr. TAWNEY. How many acres?

Mr. OGAARD. About 10 acres.

Mr. MIGNAULT. That was lowland?

Mr. OGAARD. Part of it was low, and at times it was flooded, but as far as raising a hay crop on it, that would not interfere with it, because the water would recede at the time the crop was harvested, and it would not interfere with it.

Mr. MIGNAULT. Would it be as valuable as the land you sold to a party in Ranier?

Mr. OGAARD. Yes, it would be about the same thing, except any one who buys land out there likes to be out on the lake.

Mr. MIGNAULT. But is low land as valuable as high land?

Mr. OGAARD. It is better; it is a black loam with a clay subsoil, and that low land is the most fertile of the two.

Mr. RICHARDSON. Did you ever sell any land in this county for \$200 an acre?

Mr. OGAARD. No, I never did.

Mr. RICHARDSON. Do you know of anybody that ever sold any agricultural land in this county for \$200 an acre?

Mr. OGAARD. Why, I do not know as I did. I do not know of anybody selling improved land round here for agricultural purposes; that is, land right close to town.

Mr. RICHARDSON. You have been in this county a good many years?

Mr. OGAARD. Twenty-two years next 6th of April.

Mr. RICHARDSON. Have you ever appraised lands for any purposes?

Mr. OGAARD. No.

Mr. RICHARDSON. In this county?

Mr. OGAARD. No, sir.

Mr. RICHARDSON. You have never acted as an appraiser for the State of Minnesota on any lands?

Mr. OGAARD. No.

Mr. RICHARDSON. You have never acted as an appraiser in any court proceedings?

Mr. OGAARD. No, sir. I have appraised timberlands, but not agricultural lands, and that was for a railroad company.

Mr. RICHARDSON. You mean by appraising timberlands that you cruised and valued?

Mr. OGAARD. Yes.

Mr. RICHARDSON. Valued the lands and timber together?

Mr. OGAARD. Yes.

Mr. RICHARDSON. And in making your cruise and in making your report, did you value the land separately from the timber?

Mr. OGAARD. Such examinations as I refer to were done for the timber only; there were no land values taken into consideration.

Mr. RICHARDSON. Is it not a fact that you valued the entire property, timber and all?

Mr. OGAARD. No, we did not report on anything but the timber.



Mr. RICHARDSON. You did not report on anything but the timber?

Mr. OGAARD. No.

Mr. RICHARDSON. You regarded the land as worthless?

Mr. OGAARD. That was not to be considered.

Mr. RICHARDSON. Not worth considering?

Mr. OGAARD. No.

Mr. SAMUELSON. I did not catch that answer.

(Last two questions and answers read.)

Mr. OGAARD. Our instructions were to go out and examine the timber on the land; the land itself was not taken into consideration.

Mr. RICHARDSON. Are you sure about that?

Mr. OGAARD. Yes, I am sure. I looked at some of those estimates not long ago; that was for Mr. Arnold; he was for the Iron Range Railroad at the time. I worked for him for five months.

Mr. RICHARDSON. What railroad company was it you made those appraisements for?

Mr. OGAARD. It was a railroad—I do not know whether it is in existence, the Minnesota & Pacific.

Mr. ROCKWOOD. The Wisconsin, Minnesota & Pacific.

Mr. OGAARD. I think that was it.

Mr. RICHARDSON. That was connected with the Rock Island road.

Mr. OGAARD. They had a land grant from the State that had not been gone over and they sent out three cruising parties in the field all one winter, and I had charge of one, and we had orders to examine and pick out the land that had the best timber; we had something like 70 townships, and we cruised over those and reported the timber we found on the different sections.

Mr. RICHARDSON. What year?

Mr. OGAARD. That is 20 years ago this winter.

Mr. RICHARDSON. Have you ever made any valuations for tax purposes?

Mr. OGAARD. No.

Mr. RICHARDSON. Are the lands above International Falls—that is, to the east—any different in their character from those down the river or to the west?

Mr. OGAARD. Why, no; not in the vicinity. After you get east, oh, about 4 miles from here, all this area from here west to the Red River Valley is all covered with drift. When you get farther east you do not find very much drift, you find rock exposure all through; so the land east is not as good—that is, when you get 4 or 5 miles east into that rocky country; the agricultural lands, with the exception of small tracts, are not as good as the land west.

Mr. TAWNEY. The land beyond the 4-mile limit east is generally rocky land, is it?

Mr. OGAARD. Yes; when you get a little over a mile east, say of this lot 4 we have reference to, you get into a rocky country. The shores are abrupt and rocky.

There is only a small tract here and there that is agricultural land.

Mr. RICHARDSON. How far back from the lake toward the south does that rock extend on an average, so far as outcrop shows?

Mr. OGAARD. All through there the rock outcrops clean down to Tower, Minn., all through the north end of St. Louis County is rocky exposure.

Mr. TAWNEY. How many miles is that?

Mr. OGAARD. About 90 miles from here.

Mr. RICHARDSON. And how far south of Namikin Lake would Tower be?

Mr. OGAARD. About 60 miles.

Mr. RICHARDSON. Your cottage and the land surrounding it you regard as a lake resort proposition?

Mr. OGAARD. No, not—

Mr. RICHARDSON. And you put your valuation on it from a lake resort view, do you?

Mr. OGAARD. No, not fully, Mr. Richardson. I put it on from the value that we received from similar land, plus what I put on to it, because that land I sold for \$150 an acre had no improvements, and this land \$150, plus the improvements—that is the way I value it. There is no summer resort considered in that. Of course if I should consider it from that, I would not want to sell it for that.

Mr. RICHARDSON. What did the railway company get that land for?

Mr. OGAARD. I do not know; they have it there yet.

Mr. RICHARDSON. Have they ever used it?

Mr. OGAARD. No, no.

Mr. RICHARDSON. What did you say was the name of the railroad?

Mr. OGAARD. It is a branch of the Canadian Northern running from Ranier to Duluth.

Mr. RICHARDSON. How far is it from the Canadian Northern Railway right of way and line which runs from Ranier to Duluth?

Mr. OGAARD. My land?

Mr. RICHARDSON. No; this piece.

Mr. OGAARD. Oh, that is probably an eighth of a mile from the west end of this lot 3 I refer to, to the right of way of the road—something like that.

Mr. RICHARDSON. Did they buy this land with a view of occupying it and using it for terminal facilities?

Mr. OGAARD. No.

Mr. RICHARDSON. You had no idea of what they wanted to do with it?

Mr. OGAARD. No.

Mr. RICHARDSON. Had you done any work or favors for the railway company?

Mr. OGAARD. No; they wanted me to go out on their surveys, but I was busy with other work and could not do it.

Mr. MIGNAULT. Was that a cash sale?

Mr. OGAARD. Yes, a cash sale, and the papers were made out and we got the draft.

Mr. MIGNAULT. What year was that?

Mr. OGAARD. I would not be sure now; I could look it up—I think it was six years ago—it was just at the time they started to extend the road up from Virginia running north.

Mr. MIGNAULT. Do you know of any other land they bought in that vicinity at any such price?

Mr. OGAARD. They bought from John A. Holerod—they bought their land where the town site of Ranier is located. I think the lot comprises 49 acres, I would not be certain, and to the best of my recollection he got \$8,000 cash for it.



Mr. MIGNAULT. And immediately afterwards the town site was located on it, was it?

Mr. OGAARD. Probably six months or so afterwards.

Mr. MIGNAULT. Did you survey that town site?

Mr. OGAARD. No; Mr. Cook, of Duluth, surveyed it.

Mr. TAWNEY. How near was the land you sold located to the town site of Ranier?

Mr. OGAARD. Just adjoining this land.

Mr. RICHARDSON. On which side—in which direction?

Mr. OGAARD. East of the town site; there would be my land, lot 4, and the town site.

Mr. ROCKWOOD. It was not the railway company bought the land, but a town-site company.

Mr. OGAARD. It was Mr. Cook—it was not stated about any company, any more than it was Bert Cook, of Duluth, we got the money from.

Mr. ROCKWOOD. He was president of the railway company?

Mr. OGAARD. Yes.

Mr. ROCKWOOD. And he was trying to build a city at Ranier and bought this land for that purpose; is that not so?

Mr. OGAARD. I presume probably he did; he did not say anything about that to me or anybody else, in fact, we made the deal through Pat Smith, of Fort Frances.

Mr. ROCKWOOD. Do you know how much they bought altogether?

Mr. OGAARD. I could not say; they have bought some from Mrs. Jamieson; they must have a couple of hundred acres in there, I would judge—I would think so.

Mr. ROCKWOOD. And how many people are there now in the city of Ranier?

Mr. OGAARD. Probably 500; about that; not any more than that.

Mr. ROCKWOOD. They have been a little disappointed in the matter?

Mr. OGAARD. I think so; I do not know; I never asked them any questions.

### TESTIMONY OF BERNT M. WEBERG, OF RANIER.

BERNT M. WEBERG, having been duly sworn, deposed as follows:

Mr. SAMUELSON. Your post-office address is Ranier?

Mr. WEBERG. Yes.

Mr. SAMUELSON. And you are the owner of the southwest quarter of the northeast quarter and lot No. 2 in section 36, township 71, range 23?

Mr. WEBERG. Yes.

Mr. SAMUELSON. How much of your land have you in hay meadow and in cultivated land?

Mr. WEBERG. About 18 acres.

Mr. SAMUELSON. What is the nature of the soil of the rest of your land?

Mr. WEBERG. Timberland.

Mr. SAMUELSON. And what class of timber is upon that land?

Mr. WEBERG. Poplar and ash, part of it, and spruce and tamarac.

Mr. SAMUELSON. What is the value of the land in hay meadow and cultivated land per acre?

Mr. WEBERG. \$75 an acre.

Mr. SAMUELSON. What is the value of the land that is in timber per acre?

Mr. WEBERG. \$40.

Mr. TAWNEY. How did you arrive at the value of your meadow and cultivated land? Is there any market value or any land that has been sold in that vicinity at that price, or anything near that price?

Mr. WEBERG. Not that kind of lands that I know of.

Mr. TAWNEY. How do you estimate the value of your land \$75 per acre; on what basis?

Mr. WEBERG. It is all cleared meadow and solid bottom—black loam and clay bottom.

Mr. TAWNEY. What does it produce per acre in hay?

Mr. WEBERG. I never cut any hay on it.

Mr. MIGNAULT. How much did you pay for it?

Mr. WEBERG. I bought it from the State sale of school lands at six and a half an acre.

Mr. MIGNAULT. How long ago?

Mr. WEBERG. I bought it in 1911, 14th September; that is, lot 1, and the other 40 I bought a month later in 1911.

Mr. TAWNEY. What did you buy it for?

Mr. WEBERG. To make my home there.

Mr. TAWNEY. Are you living on it now?

Mr. WEBERG. Yes.

Mr. TAWNEY. What kind of buildings or improvements have you on it?

Mr. WEBERG. I have a living house.

Mr. MIGNAULT. Log or frame?

Mr. WEBERG. Log. It is 14 by 30, and a storehouse or pool room, and one thing and another—log house 12 by 12 inside and chicken house 10 by 12 and ice house 10 by 10 and woodshed 10 by 20.

Mr. MIGNAULT. Are those buildings on the higher part of the land?

Mr. WEBERG. They are not very far from the creek. I like to be as close to the creek as I can, and so I did not put it so very far back; it is 7 or 8 rods from the water.

Mr. TAWNEY. You are located on a bay?

Mr. WEBERG. Yes.

Mr. TAWNEY. Which is the mouth of the creek running back?

Mr. WEBERG. Yes.

Mr. TAWNEY. What did the buildings cost you?

Mr. WEBERG. I built them myself; I could not say exactly what it cost me.

Mr. MIGNAULT. Where did you get the logs?

Mr. WEBERG. The logs were cut on the land.

Mr. MIGNAULT. And you built it yourself?

Mr. WEBERG. Yes.

Mr. TAWNEY. What do you raise on the place now?

Mr. WEBERG. Potatoes and garden vegetables.

Mr. MIGNAULT. How many acres of potatoes?



Mr. WEBERG. Just a little bit; just enough for myself.

Mr. MIGNAULT. Not for sale?

Mr. WEBERG. No.

Mr. MIGNAULT. What else do you raise?

Mr. WEBERG. That is all I raise on it now.

Mr. MIGNAULT. You never cut the hay?

Mr. WEBERG. I never cut the hay.

Mr. MIGNAULT. And you raise enough potatoes for your own use?

Mr. WEBERG. Yes.

Mr. MIGNAULT. That is the only cultivation you have done?

Mr. WEBERG. I intended to have a few cows and a horse and one thing and another at the time I bought it, but the next year the water went up, and it has been flooded since in the meadows, so that I could not cut any hay. The year I bought the land there was hay-stacks in the meadow across from me on the other side of the creek; well, it is 3 feet of water now.

Mr. MIGNAULT. Did you erect your buildings the same year you bought, or later?

Mr. WEBERG. Part of it, the same fall, the living house.

Mr. MIGNAULT. What part did you build the same fall?

Mr. WEBERG. The house I am living in, 14 by 30.

Mr. MIGNAULT. And the rest you built the following year, 1912?

Mr. WEBERG. No; I built some off and on. I have built a little pretty near every fall every year; added to it.

Mr. TAWNEY. What occupation have you other than cultivating? What do you do?

Mr. WEBERG. I have been building and repairing boats?

Mr. TAWNEY. That is your business?

Mr. WEBERG. Yes.

Mr. MIGNAULT. You do not cultivate land as a business?

Mr. WEBERG. I intended to when I bought the land.

Mr. MIGNAULT. But you have not done so?

Mr. WEBERG. No; I have not done anything to cultivate it, and when I could not raise anything there I could not stay there; I stayed in the village of Ranier.

Mr. TAWNEY. Do you stay in Ranier?

Mr. WEBERG. No; but I have been there, because I could get more work. I could not make anything there.

Mr. MIGNAULT. Do you occupy the house you built on your land?

Mr. WEBERG. I do now. I am living in it now.

Mr. MIGNAULT. How far is it from Ranier?

Mr. WEBERG. It is six miles and a half from Ranier.

Mr. MIGNAULT. Any roads there?

Mr. WEBERG. There are winter roads.

Mr. MIGNAULT. No road for the summer?

Mr. WEBERG. Not to my place.

Mr. MIGNAULT. To get to your property you have to go by water?

Mr. WEBERG. Yes.

Mr. MIGNAULT. Or over the ice in winter?

Mr. WEBERG. Yes.

Mr. SAMUELSON. You do not have to go on the ice in the winter time to get to your place?

Mr. WEBERG. No; I go on the ice across the creek to Erickson's and go from there.

Mr. SAMUELSON. That is to Algot Erickson, the other witness who was examined last night?

Mr. WEBERG. Yes.

Mr. RICHARDSON. How do you fix the value of \$75 an acre on your land?

Mr. WEBERG. It is worth that to me if it was not flooded; I would not take that for it; I would not sell it for that. I like that place and I like to live there.

Mr. RICHARDSON. Where did you farm before you came up here?

Mr. WEBERG. I never did any farming.

Mr. RICHARDSON. This is the first land you ever owned?

Mr. WEBERG. Yes.

Mr. RICHARDSON. You have not sold it or any part of it?

Mr. WEBERG. No.

Mr. RICHARDSON. You have not bought any other land?

Mr. WEBERG. No, sir.

Mr. RICHARDSON. You do not know of any land round it that has been bought or sold, do you?

Mr. WEBERG. Not only what is bought from the State of Minnesota.

Mr. RICHARDSON. You got this land from the State at public auction, did you not?

Mr. WEBERG. Yes.

Mr. RICHARDSON. You bought one 40 in the fall of 1911?

Mr. WEBERG. Yes.

Mr. RICHARDSON. You did not buy the other 40 at the same sale, did you?

Mr. WEBERG. No.

Mr. RICHARDSON. The other sale was the next year, was it not?

Mr. WEBERG. No; the same fall.

Mr. RICHARDSON. Did the State of Minnesota have two sales of school lands the same fall?

Mr. WEBERG. Yes.

Mr. MIGNAULT. He said about a month after.

Mr. RICHARDSON. I know, but that is rather unusual.

Mr. SAMUELSON. I do not see that it makes a great deal of difference.

Mr. TAWNEY. I do not see that it is material, if he bought it from the State, what month he bought it.

Mr. RICHARDSON. I had an idea that if it was bought in 1912 it might have some bearing.

Mr. TAWNEY. You paid \$6.50 an acre for both tracts?

Mr. WEBERG. Yes.

Mr. MIGNAULT. Public auction?

Mr. WEBERG. Yes.

Mr. TAWNEY. Do you know how much taxes you are paying on that land?

Mr. WEBERG. Yes. Two years ago I paid—I can not say exactly to a cent, but it is between \$17 and \$18.

Mr. TAWNEY. That is about the annual taxes?

Mr. WEBERG. Yes; and last year on account of so much of it was flooded, the tax was somewhere round \$5.



Mr. MIGNAULT. On the whole property?

Mr. WEBERG. Yes.

Mr. SAMUELSON. You made application, did you, to have your taxes reduced, because of the fact that so much of it was under water?

Mr. WEBERG. Yes.

### TESTIMONY OF EDWARD BANCROFT.

EDWARD BANCROFT, having been duly sworn, testified as follows:

Mr. TAWNEY. Where do you live?

Mr. BANCROFT. International Falls.

Mr. TAWNEY. What is your occupation?

Mr. BANCROFT. Saloon keeper.

Mr. RICHARDSON. You are the husband of Sadie Bancroft?

Mr. BANCROFT. Yes.

Mr. SAMUELSON. Are you acquainted with lots 1 and 2 and 3 in section 33, township 71, range 23?

Mr. BANCROFT. Yes.

Mr. SAMUELSON. How far is that from Ranier?

Mr. BANCROFT. About 9 miles—9 miles from the Falls, 6 miles from Ranier.

Mr. SAMUELSON. What is the nature of the soil there?

Mr. BANCROFT. There is part of it is high rock like that shore along there, and then there is a creek runs through the back of it to a hay meadow there; I should judge about 25 or 30 acres; I could not tell you exactly.

Mr. SAMUELSON. Has the hay meadow that is there been all flooded?

Mr. BANCROFT. Yes.

Mr. SAMUELSON. That is now all under water?

Mr. BANCROFT. Yes.

Mr. SAMUELSON. How long has your wife owned that land?

Mr. BANCROFT. If I am not mistaken, it is nine years since she has had that.

Mr. SAMUELSON. Did your wife buy that, or how did she become possessed of it?

Mr. BANCROFT. She took it under the stone and timber act.

Mr. SAMUELSON. And purchased it direct from the United States Government?

Mr. BANCROFT. Yes.

Mr. SAMUELSON. How much is that hay meadow worth per acre, in your opinion?

Mr. BANCROFT. \$50.

Mr. MIGNAULT. What do you base that on?

Mr. BANCROFT. On that lake land and the frontage of the lake and all that land along there.

Mr. MIGNAULT. Do you know of any similar land being sold for anything like that price?

Mr. BANCROFT. Not very far this way—I think 3 miles farther—there is quite a bit of land plotted into lots that were sold as acre lots.

Mr. SAMUELSON. For summer residences?

Mr. BANCROFT. Yes.

Mr. SAMUELSON. But farming land?

Mr. BANCROFT. No; I do not.

Mr. SAMUELSON. Is this land of Mrs. Bancroft's suitable for summer homes? Was it before it was flooded?

Mr. BANCROFT. That particular spot was not; you could not very well live on it at the time of the year that water would be too high to build on that particular spot.

Mr. SAMUELSON. But it was excellent hay land?

Mr. BANCROFT. Yes; it was.

Mr. SAMUELSON. Did you ever cut that hay yourself?

Mr. BANCROFT. No, sir.

Mr. TAWNEY. What kind of grass grows on that?

Mr. BANCROFT. Blue joint, I believe, they call it.

Mr. TAWNEY. That is the wild grass?

Mr. BANCROFT. Yes.

Mr. TAWNEY. Has the meadow land you speak of ever been cut?

Mr. BANCROFT. Yes; it has been cut since I owned it, but I never cut it myself.

Mr. TAWNEY. How many tons would it yield?

Mr. BANCROFT. I do not know. A fellow by the name of Lezar lived up the lake, a little beyond me there, and he was getting out logs, and he asked me what I would take for that hay, and I told him—if he would cut it and clean it up and burn it off, if he would clean it off—he could have the hay. So he cut the hay two summers and cleaned it up.

Mr. TAWNEY. All you got for the hay was the work he did in cleaning up the land?

Mr. BANCROFT. Yes.

Mr. TAWNEY. Is that under water now the year round?

Mr. BANCROFT. Anytime I have been up there it has been under water in the summer time. I have not been up there in the winter.

Mr. TAWNEY. Have you a house on it?

Mr. BANCROFT. I have just a little bit of a shack on it, one thickness of board and tar paper.

Mr. RICHARDSON. You have never bought or sold any land in that vicinity?

Mr. BANCROFT. Not up in there.

Mr. RICHARDSON. Do you know blue joint when you see it?

Mr. BANCROFT. I know when they tell me, that is all.

Mr. RICHARDSON. If you were shown a piece of grass, could you tell whether it was blue joint or not?

Mr. BANCROFT. I think I could.

Mr. RICHARDSON. Have you ever worked a farm?

Mr. BANCROFT. I have worked on farms for other people.

Mr. RICHARDSON. How long ago?

Mr. BANCROFT. When I was about 18 or 19 years old, from that time up to the time I was big enough to work, I used to work more or less.

Mr. RICHARDSON. How old are you now?

Mr. BANCROFT. Fifty years old.



**TESTIMONY OF HERMAN LOMKER.**

HERMAN LOMKER, having been duly sworn, testified as follows:

Mr. SAMUELSON. You are the owner of the northwest quarter of the southwest quarter of section 4-70-22?

Mr. LOMKER. Yes.

Mr. SAMUELSON. And also the southwest quarter of the northeast quarter and the north half of the southeast quarter of section 5-70-22?

Mr. LOMKER. Yes.

Mr. MIGNAULT. His land is not on the lake.

Mr. SAMUELSON. Does your land border on the lake?

Mr. LOMKER. No; it does not.

Mr. SAMUELSON. How long have you had that land?

Mr. LOMKER. Since 1909. I filed on it and I paid \$500 for the relinquishment.

Mr. SAMUELSON. And have you lived on that land ever since.

Mr. LOMKER. Not continuously. I have been on it several different times.

Mr. SAMUELSON. Have you proved up on it?

Mr. LOMKER. Yes, I have proved up in 14 months; I have been there continuously.

Mr. SAMUELSON. And you have it patented from the United States Government?

Mr. LOMKER. Yes, sir.

Mr. SAMUELSON. What is the nature of that land?

Mr. LOMKER. Well, some of the land, the high ground, is stony, and other places there is good agricultural land, and a part of it was nice meadow.

Mr. SAMUELSON. How much of that land was meadowland?

Mr. LOMKER. According to Mr. Berg's survey there was 32 acres.

Mr. SAMUELSON. Of meadowland?

Mr. LOMKER. Yes.

Mr. SAMUELSON. Did you cut any hay on that meadow?

Mr. LOMKER. I cut about 2 acres there in 1910.

Mr. SAMUELSON. How much hay did you cut to an acre there?

Mr. LOMKER. About three tons off the 2 acres, about a ton and a half to the acre.

Mr. SAMUELSON. How much of that meadowland is now overflowed?

Mr. LOMKER. All of it.

Mr. SAMUELSON. Is there any of the high land overflowed?

Mr. LOMKER. No, there is not.

Mr. SAMUELSON. There is none of the timberland overflowed?

Mr. LOMKER. None of the timberland.

Mr. SAMUELSON. The meadowland is all overflowed?

Mr. LOMKER. Yes.

Mr. SAMUELSON. If the water were raised 2 feet higher than it is at the present time, would that, then, take in some of the timberland?

Mr. LOMKER. It would take in quite a bit of it.

Mr. SAMUELSON. What is that meadowland worth per acre?

Mr. LOMKER. \$60 an acre.

Mr. MIGNAULT. On what do you base that?

Mr. LOMKER. On the crops that it produced.

Mr. MIGNAULT. Do you know of any similar land ever having been sold for that price?

Mr. LOMKER. I do not.

Mr. TAWNEY. How much State land is there between your land and the shore of the lake?

Mr. LOMKER. That I do not exactly know.

Mr. TAWNEY. What is the distance across the State land?

Mr. LOMKER. I have never measured it.

Mr. TAWNEY. Well, about—give us an approximate idea—quarter of a mile?

Mr. LOMKER. In the neighborhood of a quarter of a mile.

Mr. TAWNEY. Did you ever go across the State land to get to the lake?

Mr. LOMKER. Yes, I do.

Mr. TAWNEY. Is that not overflowed, too?

Mr. LOMKER. It is at the present time.

Mr. TAWNEY. Is it in the summer time?

Mr. LOMKER. It has been for a couple of years.

Mr. TAWNEY. Was it overflowed last summer?

Mr. LOMKER. Yes.

Mr. TAWNEY. How did you get on your land?

Mr. LOMKER. With a rowboat—flat bottom.

Mr. TAWNEY. Is there any road?

Mr. LOMKER. Only the winter roads.

Mr. TAWNEY. What improvements have you on your place?

Mr. LOMKER. Well, there is a house on it 14 by 20.

Mr. TAWNEY. Log?

Mr. LOMKER. The house is logs, except the end, and the gable is board, and it is cedar up and down stairs.

Mr. TAWNEY. Is that the only building on it?

Mr. LOMKER. That is really the only building on it.

Mr. TAWNEY. What did that cost you?

Mr. LOMKER. It cost me, besides my own labor, in the neighborhood of \$100.

Mr. TAWNEY. Have you any stock on the place?

Mr. LOMKER. I have not.

Mr. TAWNEY. Do you live on it?

Mr. LOMKER. I do at present.

Mr. TAWNEY. How long have you occupied the house?

Mr. LOMKER. Since 1910; I built the house in 1910.

Mr. TAWNEY. You have lived there since?

Mr. LOMKER. Not continuously; I have been there different times.

Mr. TAWNEY. And about how long in the year do you live there?

Mr. LOMKER. In the neighborhood of nine months.

Mr. TAWNEY. About nine months each year?

Mr. LOMKER. Yes.

Mr. TAWNEY. What is your occupation?

Mr. LOMKER. Farmer.

Mr. TAWNEY. Have you other lands besides this that you farm?

Mr. LOMKER. Not at the present time.

Mr. TAWNEY. How do you farm, if you have no stock?

Mr. LOMKER. Oh, I break up ground with a spade.

Mr. TAWNEY. About how many acres of this land is under cultivation?



Mr. LOMKER. There is about a quarter of an acre.

Mr. MIGNAULT. What kind of crops?

Mr. LOMKER. Potatoes and vegetables.

Mr. MIGNAULT. How much of this land could you cultivate if it was cleared off?

Mr. LOMKER. About half or a little better than half that is not flooded.

Mr. MIGNAULT. And that is about how much?

Mr. LOMKER. In the neighborhood of 60 acres.

Mr. MIGNAULT. Which could be cultivated if it was cleared?

Mr. LOMKER. Yes.

Mr. MIGNAULT. What is the reason you did not clear it?

Mr. LOMKER. Well, to be plain about it, I have been 21 for some time.

Mr. MIGNAULT. You have been 21?

Mr. LOMKER. Yes; and I consider that as I was a single man I could go out and do as I pleased, and I figure any time I can go and make it my permanent home; so far I have not done so.

Mr. MIGNAULT. Have you cut the hay off the meadow land any time since you had it?

Mr. LOMKER. Two acres one year.

Mr. MIGNAULT. What year was that?

Mr. LOMKER. In 1910; the first summer I was there I was just clearing up the land round the buildings.

Mr. MIGNAULT. When was the land first overflowed?

Mr. LOMKER. In 1912 hay could not be cut.

Mr. MIGNAULT. You did not take hay off in 1911?

Mr. LOMKER. No; I did not. I was in the dairy business in 1911 in the vicinity of this town.

Mr. MIGNAULT. You do not know of any lands that have been sold in the vicinity at \$60 an acre?

Mr. LOMKER. I do not; the only land I know of being sold close by at \$40 an acre was just across the bay.

Mr. MIGNAULT. When was that?

Mr. LOMKER. I do not just know when the sale took place. It was sold by Erb Houstable to Harry Robinson.

Mr. MIGNAULT. Was that improved land?

Mr. LOMKER. It was not.

Mr. MIGNAULT. Any buildings on it?

Mr. LOMKER. No.

Mr. MIGNAULT. Just wild land?

Mr. LOMKER. Yes.

Mr. MIGNAULT. What was it bought for?

Mr. LOMKER. That I do not know.

Mr. MIGNAULT. Had it been improved by the purchaser since he bought it?

Mr. LOMKER. Not yet.

Mr. RICHARDSON. Did you live on the land in 1911?

Mr. LOMKER. I did not; not during the summer. I did in the fall.

Mr. RICHARDSON. You went there in the fall; what part of the fall?

Mr. LOMKER. In the neighborhood of 1st of November.

Mr. RICHARDSON. Did you cut the 2 acres of hay yourself?

Mr. LOMKER. Not in 1911; I did not cut any hay.

Mr. RICHARDSON. You cut that in 1910?

Mr. LOMKER. Yes, sir; I cut part of it. I had men help me cut.

Mr. RICHARDSON. Who helped you cut?

Mr. LOMKER. A fisherman on the lake.

Mr. RICHARDSON. What was his name?

Mr. LOMKER. A. B. Lenstrum.

Mr. RICHARDSON. What month did you cut?

Mr. LOMKER. I could not say as to whether it was the latter part of July or fore part of August.

Mr. RICHARDSON. The water was higher in 1911 than it was in 1910, in the summer?

Mr. LOMKER. That I do not know.

Mr. RICHARDSON. You were not there?

Mr. LOMKER. I was not there in the summer, as I told you.

Mr. RICHARDSON. Were you there in the winter of 1911 and 1912?

Mr. LOMKER. I was.

Mr. RICHARDSON. What time did you go there in the fall?

Mr. LOMKER. Just a minute ago I told you the fore part of November.

Mr. RICHARDSON. Was the water higher then than it was the November before?

Mr. LOMKER. Well, I could not say as to that.

Mr. RICHARDSON. Was the water higher in 1912 than it was in 1910?

Mr. LOMKER. It was during the summer.

Mr. RICHARDSON. What months?

Mr. LOMKER. June, July, August, and September.

Mr. RICHARDSON. And did it then go down?

Mr. LOMKER. It did not go down then till after it was closed up.

Mr. RICHARDSON. What time did it begin to go down?

Mr. LOMKER. Shortly after it was closed up.

Mr. RICHARDSON. What month?

Mr. LOMKER. I would not say whether it was the latter part of October or the fore part of November.

Mr. RICHARDSON. When were you in the dairy business?

Mr. LOMKER. In 1911.

Mr. RICHARDSON. Here at International Falls?

Mr. LOMKER. Yes.

Mr. RICHARDSON. For yourself?

Mr. LOMKER. Yes.

Mr. RICHARDSON. How many cows did you have?

Mr. LOMKER. Nine head.

Mr. RICHARDSON. And you did not cut the hay off this meadow?

Mr. LOMKER. I did not.

Mr. SAMUELSON. I have a witness who desires to get away at 12 o'clock, and if the committee will allow this witness to stand aside for a few minutes, we will take him now.

Mr. TAWNEY. No objection.

#### TESTIMONY OF JOHN SKOGLUND.

JOHN SKOGLUND, having been duly sworn, testified as follows:

Mr. TAWNEY. Where do you live?

Mr. SKOGLUND. Ericksburg.



Mr. SAMUELSON. You are the owner of the northeast quarter of the southwest quarter of section six: 69-23?

Mr. SKOGLUND. Yes.

Mr. SAMUELSON. What kind of land is that?

Mr. SKOGLUND. It is high land.

Mr. SAMUELSON. Is there any clearing on that land?

Mr. SKOGLUND. Yes.

Mr. SAMUELSON. How much of it is cleared?

Mr. SKOGLUND. I never measured it, but there is about 13 or 14 acres.

Mr. SAMUELSON. What did you use that 13 or 14 acres for?

Mr. SKOGLUND. For hay and potatoes—

Mr. TAWNEY. Tame or wild hay?

Mr. SKOGLUND. Tame hay.

Mr. TAWNEY. It is high land, I understood you to say?

Mr. SKOGLUND. Yes.

Mr. TAWNEY. How much of that land is overflowed at the present time?

Mr. SKOGLUND. Of the clearing, you mean?

Mr. TAWNEY. Yes.

Mr. SKOGLUND. Well, I can not tell you for sure; it must be about 6 or 7 acres.

Mr. TAWNEY. Mr. Berg measured up the amount of land that was flooded there?

Mr. SKOGLUND. Yes, sir.

Mr. TAWNEY. What is that land worth an acre?

Mr. SKOGLUND. It is worth about \$60 an acre.

Mr. MIGNAULT. On what do you base the value of \$60 an acre?

Mr. SKOGLUND. It cost me more than that after I got it cleared.

Mr. MIGNAULT. Do you know of any sales in your neighborhood of land of that description?

Mr. SKOGLUND. No.

Mr. TAWNEY. When you clear the land, taking the timber off, what is the timber worth?

Mr. SKOGLUND. The timber was taken off before I came there.

Mr. TAWNEY. I understood you to say you figured it was worth \$60 including the cost of clearing it?

Mr. SKOGLUND. Yes.

Mr. MIGNAULT. You did not clear it?

Mr. SKOGLUND. Yes.

Mr. TAWNEY. What kind of timber was it that you took off?

Mr. SKOGLUND. The timber was taken off before—

Mr. TAWNEY. What was the clearing you had to do? Removing the stumps?

Mr. SKOGLUND. Yes.

Mr. TAWNEY. What did you pay for it?

Mr. SKOGLUND. I paid \$450 for the 40.

Mr. TAWNEY. You bought it when.

Mr. SKOGLUND. Four years ago.

Mr. TAWNEY. From whom did you buy it?

Mr. SKOGLUND. Stanley Walt.

Mr. MIGNAULT. Was that a cash sale?

Mr. SKOGLUND. Yes.

Mr. RICHARDSON. What is your business?

Mr. SKOGLUND. Sometimes I do some farming and the rest of the time lumbering.

Mr. RICHARDSON. Where did you come from before you came up here?

Mr. SKOGLUND. Black Duck.

Mr. RICHARDSON. Did you ever do any farming down there?

Mr. SKOGLUND. No.

Mr. RICHARDSON. Ever farm till you came up here?

Mr. SKOGLUND. No.

Mr. RICHARDSON. You did not own any land at Black Duck?

Mr. SKOGLUND. No.

Mr. RICHARDSON. This is the first land you owned?

Mr. SKOGLUND. Yes.

Mr. RICHARDSON. Ever clear up any land before?

Mr. SKOGLUND. Yes.

Mr. RICHARDSON. Where?

Mr. SKOGLUND. Black Duck.

Mr. RICHARDSON. Working for somebody else?

Mr. SKOGLUND. Yes.

Mr. RICHARDSON. How much did you get a day?

Mr. SKOGLUND. I got so much an acre.

Mr. RICHARDSON. How much an acre?

Mr. SKOGLUND. \$12 an acre.

Mr. RICHARDSON. For clearing?

Mr. SKOGLUND. Yes.

#### TESTIMONY OF HERMAN LUMKER—Resumed.

HERMAN LUMKER, having been previously sworn, was recalled and testified as follows:

Mr. RICHARDSON. Why did you not get hay off your land for the stock?

Mr. LUMKER. I was in the dairy business, and I figured selling out that fall, which I did.

Mr. RICHARDSON. You went in the dairy business when?

Mr. LUMKER. In the spring.

Mr. RICHARDSON. And sold out in the fall?

Mr. LUMKER. Yes.

Mr. RICHARDSON. And made no preparation for winter feeding?

Mr. LUMKER. I did not.

Mr. RICHARDSON. What did you do before you came up here?

Mr. LUMKER. Farming, lived on a farm.

Mr. RICHARDSON. Where?

Mr. LUMKER. Southern Minnesota.

Mr. RICHARDSON. Where?

Mr. LUMKER. Whitestone.

Mr. RICHARDSON. Near what town?

Mr. LUMKER. Our closest town was in South Dakota; Ward, S. Dak.

Mr. RICHARDSON. Did you own that land?

Mr. LUMKER. I owned an interest in it.

Mr. RICHARDSON. Do you mean it was your father's farm, or some relative's?



Mr. SAMUELSON. What difference does it make whether he owned it or whether his brother owned it?

Mr. LUMKER. There were four brothers of us owned it.

Mr. RICHARDSON. Did you ever own any other land?

Mr. LUMKER. No, sir.

Mr. RICHARDSON. Did you ever clear any land?

Mr. LUMKER. Only what I cleared up around my building.

Mr. RICHARDSON. Up the lake?

Mr. LUMKER. Yes.

Mr. RICHARDSON. That is the only clearing you ever did?

Mr. LUMKER. Yes.

Mr. RICHARDSON. And it is on that that you fix this valuation?

Mr. LUMKER. It is not on my work that I fix the valuation.

Mr. RICHARDSON. What is it on?

Mr. LUMKER. It is what I consider the place worth to me as a home, where I can make a living.

Mr. RICHARDSON. How would you propose to make a living there?

Mr. LUMKER. When I get ready I am going to clean it up.

Mr. RICHARDSON. What do you do in the meantime?

Mr. LUMKER. Why, the last three falls I have been out to the harvest field.

Mr. RICHARDSON. You mean in Dakota?

Mr. LUMKER. I mean in the harvest field, either Dakota or Southern Minnesota.

Mr. RICHARDSON. And you would get back when?

Mr. LUMKER. The latter part of October, or fore part of January.

Mr. RICHARDSON. What time did you leave to go out there?

Mr. LUMKER. Usually in the fore part of August.

Mr. RICHARDSON. What years did you go out?

Mr. LUMKER. I went in 1913, 1914, and 1915.

Mr. SAMUELSON. The next witness informs me he owns some land up in township 70, range 21, in section 30.

## TESTIMONY OF JACOB GREENGARD, OF INTERNATIONAL FALLS.

JACOB GREENGARD, having been duly sworn, testified as follows:

Mr. TAWNEY. Where do you live?

Mr. GREENGARD. International Falls.

Mr. SAMUELSON. And you are the owner of lots 4, 5, 6, 7, and 8 in section 30, and lot 3 in section 31—70—21?

Mr. GREENGARD. Yes.

Mr. SAMUELSON. What kind of land is that?

Mr. GREENGARD. It is all timber.

Mr. MIGNAULT. Anything cleared?

Mr. GREENGARD. Nothing cleared.

Mr. TAWNEY. Your land is part of one lot surrounded by water?

Mr. GREENGARD. Yes; lots 7 and 8, I understand.

Mr. TAWNEY. How many acres are there in it?

Mr. GREENGARD. I could not tell you how many acres there are there, but it is all under water, I am told.

Mr. TAWNEY. Did you ever see it?

Mr. GREENGARD. I have seen it when I was up there.

Mr. TAWNEY. Ever been on the land?

Mr. GREENGARD. Yes, nine or ten years ago.

Mr. TAWNEY. How many acres in it?

Mr. GREENGARD. About 80 in the two lots.

Mr. TAWNEY. But in the one surrounded by water?

Mr. GREENGARD. I should say about 90 acres altogether under water; 160 altogether I have got.

Mr. TAWNEY. I want to get at the area of the lot that is surrounded by water?

Mr. GREENGARD. In the two lots, 90 acres, I guess.

Mr. TAWNEY. Just the one lot?

Mr. GREENGARD. I have not been on it since. I do not know what the damage is; I just noticed it was covered by water.

Mr. TAWNEY. You say you own lots 4, 5, 6, 7, and 8?

Mr. GREENGARD. Yes.

Mr. TAWNEY. Lots 8 and 7 are the only two lots that front on the water?

Mr. GREENGARD. It has made an island there.

Mr. TAWNEY. The other lots, 4, 5, and 6, are not affected by the water at all?

Mr. GREENGARD. It does not look like it according to the map; it is just 7 and 8.

Mr. TAWNEY. Is that high land?

Mr. GREENGARD. It is medium high; some high and some low.

Mr. TAWNEY. I mean lots 7 and 8?

Mr. GREENGARD. Yes, that is high.

Mr. TAWNEY. How high?

Mr. GREENGARD. It was nice and high when I was out there.

Mr. TAWNEY. Twelve feet high?

Mr. GREENGARD. About 12 feet high.

Mr. TAWNEY. Over the water?

Mr. GREENGARD. Yes.

Mr. TAWNEY. How does the water affect it?

Mr. GREENGARD. I do not know; you can not get to it. I have not been there. I just notice on the map it is covered with water.

Mr. RICHARDSON. You noticed on what map?

Mr. GREENGARD. On the Government map.

Mr. RICHARDSON. How long since you have seen the land?

Mr. GREENGARD. I have had a man out there two or three years.

Mr. RICHARDSON. How long since you saw it?

Mr. GREENGARD. In 1906.

Mr. RICHARDSON. You have not seen it since?

Mr. GREENGARD. No; but I had a man out there three years ago.

Mr. SAMUELSON. That is all I have here at present.

Mr. TAWNEY. Is there anybody here from Fort Frances?

Mr. A. G. MURRAY. I am representing the town.

Mr. TAWNEY. Have you any testimony to offer, Mr. Richardson, in respect of land values?

Mr. RICHARDSON. We have a great deal of testimony to offer.

Mr. TAWNEY. I was going to say, we could hear your testimony and the other gentlemen, and then hear the Fort Frances testimony.

Mr. RICHARDSON. I am afraid the Fort Frances testimony would not be heard.

Mr. TAWNEY. The information the committee wishes is in respect to the values of this land, and of course we have information gath-



ered by the consulting engineers as to the several tracts that have been testified to, that are not on the maps, and we have the contours of other lands, all the State lands, have we not? Practically all the State lands have been surveyed; so that we do not need any testimony as to the extent that that would be submerged, but on the question of the value of the land and the commission would be very glad to get any testimony, either affirmative or negative, so as to arrive at a correct judgment as to what the real value of the land is. Whatever recommendation is made by the commission to the two Governments will be based upon such information as we can obtain, whether we obtain it from witnesses under oath or otherwise, but information that will satisfy the commission as to the reasonable value of this land affected in the matter of the regulation of the level of the Lake of the Woods, and incidentally that involves Rainy Lake. What the two Governments may do the commission can not say; or, if they adopt the recommendations of the commission, how they will then proceed to adjust and settle the damages in respect of the land that would be submerged at the level the commission recommends; but it is necessary, in order to afford the Governments the opportunity to act intelligently on the recommendation, for us to report as to the value of these lands that are affected or submerged by the level we recommend; so that if you have testimony here of people who are qualified to testify as to the value of lands involved here, we would be very glad to have as much of that testimony as we think is necessary to satisfy the commission, or enough for their consideration and determination of the question.

Mr. RICHARDSON. How much time will you have?

Mr. TAWNEY. It would depend on how much time the people of Fort Frances want; we would have all this afternoon and this evening.

Mr. RICHARDSON. Our experience generally is, it takes some time to show the qualifications of witnesses, and I think that the bare statement as to what land is worth could just as well be embodied in letters addressed to the commission, and perhaps Mr. Samuelson's witnesses could just as well have written letters and stated that their land was worth so much, so far as worth is concerned.

Mr. TAWNEY. We are supposed to take the testimony on this question under oath.

Mr. ROCKWOOD. There is just one point I should like to call attention to upon which, as I understand it, the engineers of the commission have not yet expressed an opinion, and that is where high-water mark is. Now, as I understand it, there is nothing in the engineers' maps that shows any land above 497, but on the other hand I do not quite understand that they have yet definitely said that 497 is high-water mark. I understand that question is reserved.

Mr. TAWNEY. That question has been reserved by the engineers, to determine on further study in connection with other studies with regard to the Lake of the Woods.

Mr. ROCKWOOD. Now, there is a statement in the reports—and if I am at all inaccurate I want to be corrected—giving the acreage below 497, but there is nothing to indicate how much of that acreage, something in the neighborhood of \$6,000 or a little more below 497, is high-water mark and how much, if any, is above high-water mark. Am I wrong about that?

Mr. MEYER. That is a correct statement. We have not made reference to ordinary high-water mark on Rainy Lake.

Mr. ROCKWOOD. So that the valuation of acreage below 497 does not signify anything with respect to high-water mark, or below high-water mark. I think Commissioner Mignault was exactly correct when he said the public in the United States, the public as we speak of it in the law of the United States, has the right to the use of the water up to high-water mark for public purposes, not alone for navigation, but for public uses, and that carries the right to maintain the water at high-water mark as against the riparian owner, and such maintenance involves no liability to the riparian owner. That makes the finding by the commission as to what is high-water mark the very beginning of the question of damage.

Mr. TAWNEY. Let me suggest a hypothetical proposition to you: Suppose that in the study of this problem, the commission should find that the levels of the Lake of the Woods can be best regulated, and the most advantageous use of the waters for all purposes specified in the reference be best obtained on the basis of the present storage of Rainy Lake, or in other words no additional storage is necessary for that purpose; in that event the commission would not report on either the extent, on the value of lands submerged in consequence of the regulation of the Lake of Woods at the level recommended. But if additional storage of water in Rainy Lake is necessary than now exists, and we find that a certain quantity, say fifty billion cubic feet more should be required, and that would necessarily raise the level of Rainy Lake, and in that way additional land would be submerged over and above that which is now submerged with the storage that there is at present in Rainy Lake, we would then have to report to the two Governments the amount of that land and its value. Now in that contingency it would be necessary for the commission, as I say, to report back to the two Governments the land submerged in consequence of this additional storage, and what the value of that land was.

Now, for the purpose of aiding the commission, if you have any testimony as to the value of these particular tracts and the value of the State lands, say, above 497, that is all that, in my judgment, would be material, and it would be material only in the event that a plan of regulation should be recommended that would necessitate greater storage capacity than there is to-day in Rainy Lake to maintain the level that would be recommended.

That is, however, only a hypothetical proposition, as the commission has reached no conclusion as to any particular plan of regulations.

Mr. ROCKWOOD. I think I understand the suggestion, and if I understand it it is that the commission does not think it material to inquire whether there is any flooding below 497 for which compensation must be—

Mr. TAWNEY. No.

Mr. MIGNAULT. Don't take that absolutely as stated—

Mr. TAWNEY. I said it was a hypothetical proposition. I did not say the commission had settled anything, because it has not.

Mr. MIGNAULT. It may be a question of the commission reporting that the maintenance of Rainy Lake at, say, a stage of 497 supplies sufficient storage for the regulation of the levels of the Lake of the



Woods, and the commission might then say that in order to maintain Rainy Lake at that stage certain lands had been flooded, and the value of those lands is so much. So that I would suggest to you that it would be wise, in your own interest, that you should present your general evidence showing the value of lands, not only above 497 but even those lands to which the evidence to-day and yesterday referred; that is, lots below 497.

Mr. ROCKWOOD. Between that point and high-water mark, if high-water mark was below 497. I had inferred that that was exactly what the commission desired, and I wanted to call attention to the fact that the engineers' report suggests no data of acreage between 497 and high-water mark if they should find that high-water mark is below 497.

Mr. MIGNAULT. Surely you can offer general evidence as to the value of those lands, subject to our determining those other questions.

Mr. ROCKWOOD. We have such evidence as Mr. Richardson has already suggested. It is very difficult to condense it into half a day, and how far we can succeed in that is a question.

Mr. MIGNAULT. That is the only way it can be done, and they must be here for cross-examination on the other side.

Mr. SAMUELSON. I respectfully submit that the statement of Mr. Rockwood just made with reference to the fact that the engineers have not located the high-water mark is somewhat erroneous. I believe that, from the maps themselves as they have been sent out—at least as I have received them and as I have seen the maps of the consulting engineers—they have drawn upon those maps a dotted blue line, which indicates the edges of vegetation. They have also placed upon those maps the kind and character of the vegetation above that blue dotted line, and I believe the testimony already shows that the meander lines and meander corners were placed at the edge of vegetation, and that, with the definition of the ordinary high-water mark, I respectfully submit the commission has now the testimony that has already been offered by the various witnesses and their own engineers; they now have the data which shows where the ordinary high-water mark is, and in connection with that they have the 497 level that has been shown upon the plat, showing the amount of acreage between what would be known as high-water mark, as defined by our own courts, and the 497 level, so that I think Mr. Rockwood is absolutely in error in stating that there is nothing to show what the high-water mark is, because it does show on the maps of the engineers.

Mr. TAWNEY. Inferentially.

Mr. SAMUELSON. Yes; inferentially. He may not have found it, but the evidence is already before the commission.

Mr. ROCKWOOD. High-water mark is a question sometimes very difficult to determine. Mr. Meyer, one of the engineers, assented that my statement was correct, that they had not reached their conclusion as to what that line is, and, not having reached it, they have not expressed it; and if the reporter got Mr. Meyer's assent to that statement in the record, I do not want to say anything.

Mr. BERKMAN. So that the power companies may not be taken un-awares, I would suggest that they present evidence of values down to low-water mark. We will not take the time here, but the question

will be raised, before we dispose of the matter, whether the riparian owners will be asked and can be asked to contribute up to ordinary high-water mark when power companies raise it way above that for their own interest, and whether or not the power companies should carry a part of the burden in the interest of navigation, and not the riparian owners, and we will take that up at Winnipeg, and the conclusions that Mr. Rockwood has arrived at will be shown to be erroneous.

Mr. MIGNAULT. It is very important and different members of the commission have expressed the opinion that when we are taking evidence of the settlers or farmers as to the values of their lands, we should have evidence to rebut any valuation they have made, so that we shall have heard both sides. So far we have had only the evidence put in by the settlers or the farmers. We have not yet had evidence of a nature to rebut that.

Mr. ROCKWOOD. That is true. We have had no opportunity.

Mr. MIGNAULT. And here is an opportunity, and if you have any such evidence to put in you should do so.

Mr. ROCKWOOD. Yes; we do not mean we are not going to. We simply say we will make the best use we can of the very short time that is left.

Mr. TAWNEY. I was going to make this suggestion, which perhaps would straighten the matter out: That if you will give to the committee the names of men who are present, who are familiar with land values, the committee will call them themselves and examine them just as far as is necessary to satisfy the committee on the question as to what their knowledge of values is and also what the value of these particular lands is, and use them as our own witnesses.

Mr. ROCKWOOD. We have a number of witnesses who are ready.

Mr. MURRAY. Will the commission take up the Fort Frances matter after lunch?

Mr. TAWNEY. We will after we get through the other.

(Adjourned till 2 o'clock.)

#### AFTER RECESS.

#### INTERNATIONAL FALLS, *January 29, 1916.*

The committee reassembled at the expiration of the recess, at 2 o'clock p. m.

Mr. TAWNEY. Are you ready to go on with the Fort Frances testimony, Mr. George?

Mr. A. D. GEORGE. I wish to enter an appearance on behalf of the Fort Frances Pulp & Paper Co., and the Ontario & Minnesota Power Co., so far as the Canadian interests are concerned. Mr. H. A. Tibbetts is here in connection with the matter that he wired Mr. Magrath about; that is, the damage on the Canadian side.

Mr. TIBBETTS. Mr. Chairman, I appear for Mr. Adolphus Gertin, of the township of Crozier. Mr. Gertin has a claim for damages for the flooding of his farm, which is situated in the township of Crozier, on Frog Creek, which creek flows into Stanjicomung Bay. I will call Mr. Gertin.



## TESTIMONY OF MR. ADOLPHUS GERTIN, OF CROZIER, ONTARIO.

ADOLPHUS GERTIN, after being duly sworn, testified as follows:

Mr. TAWNEY. What is your full name?

Mr. GERTIN. Adolphus Gertin.

Mr. TAWNEY. Where do you reside?

Mr. GERTIN. In the township of Crozier, in the Province of Ontario.

Mr. TAWNEY. What is your occupation?

Mr. GERTIN. I am a baker by trade. I am farming now.

Mr. TIBBETTS. You own a farm in the township of Crozier, Mr. Gertin, I understand?

Mr. GERTIN. Yes, sir.

Mr. TIBBETTS. What is the description of the farm?

Mr. GERTIN. The northeast quarter of section 36 in the township of Crozier.

Mr. TIBBETTS. In the district of Rainy River?

Mr. GERTIN. In the district of Rainy River.

Mr. TIBBETTS. How many acres does the farm contain?

Mr. GERTIN. 160.

Mr. MIGNAULT. Did you buy it?

Mr. GERTIN. I took it up as a homestead.

Mr. MIGNAULT. When?

Mr. GERTIN. In 1891 or 1892.

Mr. TIBBETTS. Have you a patent on that land?

Mr. GERTIN. Yes, sir.

Mr. TIBBETTS. When did you obtain your patent, Mr. Gertin?

Mr. GERTIN. I could not just exactly say.

Mr. TIBBETTS. Can you tell us the year?

Mr. GERTIN. I think it was about 1907.

Mr. TIBBETTS. Have you suffered any damage, Mr. Gertin?

Mr. GERTIN. Yes, sir.

Mr. MIGNAULT. What is the nature of the land you own?

Mr. GERTIN. It is clay and loam.

Mr. MIGNAULT. Is it cultivated?

Mr. GERTIN. It is cultivated.

Mr. MIGNAULT. How?

Mr. GERTIN. It is in hay.

Mr. MIGNAULT. Anything but hay?

Mr. GERTIN. All hay; that is, at present.

Mr. MIGNAULT. Wild hay?

Mr. GERTIN. There is practically no kind of hay on it now. It was mostly timothy hay.

Mr. TIBBETTS. To what extent has that land been damaged, Mr. Gertin, by flooding? How many acres have been flooded?

Mr. GERTIN. I had 12 acres in that piece, and there may be close onto an acre left of it. I put it at 10 acres.

Mr. TAWNEY. Ten acres that are overflowed?

Mr. GERTIN. Overflowed or damaged.

Mr. TIBBETTS. What kind of land is that that is overflowed?

Mr. GERTIN. That is clay loam.

Mr. TIBBETTS. Is it timbered?

Mr. GERTIN. No; that is the cleared or cultivated land.

Mr. MIGNAULT. Meadow?

Mr. GERTIN. Meadow.

Mr. TIBBETTS. Is there any other land flooded, Mr. Gertin?

Mr. GERTIN. Yes; there are 5 acres of uncleared land.

Mr. TIBBETTS. What is the value of the cleared land that is flooded, Mr. Gertin?

Mr. GERTIN. I would figure that it would run between \$75 and \$100 an acre.

Mr. TIBBETTS. What about the other land, the bush land?

Mr. GERTIN. The uncleared land?

Mr. TIBBETTS. Yes.

Mr. GERTIN. I would value that at between \$40 and \$50 an acre.

Mr. MIGNAULT. Upon what do you base the valuation? Do you know of any sales of similar lands?

Mr. GERTIN. Yes; I have known of sales there.

Mr. MIGNAULT. If you know of any sales, will you state what they were? We want to know what reasons you have for arriving at that figure.

Mr. GERTIN. There is some land there that sold for \$150 an acre.

Mr. MIGNAULT. Where?

Mr. GERTIN. About 3 miles from my place. There is other land there that they are asking \$300 an acre for.

Mr. MIGNAULT. What land was sold at \$150 an acre 3 miles from your place?

Mr. GERTIN. Robert Martin sold some.

Mr. MIGNAULT. Where is that located?

Mr. GERTIN. In the next township to me.

Mr. MIGNAULT. On the lake?

Mr. GERTIN. No.

Mr. MIGNAULT. Back from the lake?

Mr. GERTIN. It is on the river road like.

Mr. MIGNAULT. What was it bought for?

Mr. GERTIN. I could not exactly say.

Mr. MIGNAULT. Do you know who bought it?

Mr. GERTIN. Robert Martin.

Mr. MIGNAULT. What is he, a farmer?

Mr. GERTIN. He is a farmer.

Mr. MIGNAULT. Does he farm the land?

Mr. GERTIN. Yes; he thrashed 300 bushels of oats this fall.

Mr. MIGNAULT. How do you know that he sold it at \$100 an acre?

Mr. GERTIN. Well, he wanted to sell me some of it himself.

Mr. MIGNAULT. He told you that he sold it for \$100 an acre?

Mr. GERTIN. Yes.

Mr. MIGNAULT. How many acres did he buy?

Mr. GERTIN. I could not exactly say. I believe it was 100 and some acres, or something of that kind.

Mr. MIGNAULT. If he bought 100 acres at \$100 an acre, he paid \$10,000.

Mr. GERTIN. I do not know what he bought it for. I know what he sold it for.

Mr. MIGNAULT. Yes; but you do not know whether the land was actually sold for \$100 an acre.

Mr. GERTIN. It was sold for \$150 an acre.

Mr. MIGNAULT. How many acres?



Mr. GERTIN. Of course, I do not exactly know how many acres. That is what he was selling it at, and he told me about different ones buying. He wanted us to take an acre ourselves; said that it would be good speculation. I did not want any at the time.

Mr. TAWNEY. Was it bought for the purpose of erecting a summer residence on it?

Mr. GERTIN. I could not tell you just what it was bought for.

Mr. MIGNAULT. Were there any buildings on it.

Mr. GERTIN. I do not know; I was not over the place myself.

Mr. TAWNEY. How far is your land back from the lake?

Mr. GERTIN. I do not know how far it is.

Mr. TIBBETTS. How far is it from Stanjicoming Bay?

Mr. GERTIN. Probably 7 miles.

Mr. TIBBETTS. How far are you from the town of Fort Frances?

Mr. GERTIN. Well, I figure my place to be about 3 miles from Fort Frances.

Mr. TIBBETTS. Have you had any opportunity to sell your land in the last few years?

Mr. GERTIN. Yes; I was offered \$4,000 for it at one time.

Mr. TIBBETTS. Did you have any other offers?

Mr. GERTIN. I had an option on it for \$6,000.

Mr. MIGNAULT. Were those offers for cash?

Mr. GERTIN. At one time I could have sold 107 acres for cash; for \$6,000 cash, I guess, but at that time I had an option on it and I could not sell it.

Mr. MIGNAULT. Have you any buildings?

Mr. GERTIN. I have a building 16 by 20 on my own place.

Mr. MIGNAULT. Frame or log?

Mr. GERTIN. It is a log house.

Mr. TAWNEY. Your land is located on a creek that flows into Rainy Lake?

Mr. GERTIN. Yes; the creek flows into Rainy Lake.

Mr. MIGNAULT. You are what distance from the town of Fort Frances?

Mr. GERTIN. I figure that the distance on the direct roads may be  $3\frac{1}{2}$  miles.

Mr. MIGNAULT. You have a good road?

Mr. GERTIN. Of course, the road we have now is a long road. It is quite a ways around. It may be 6 miles to go around that way.

Mr. TAWNEY. Is your land submerged by reason of the water that is backed up from the lake in that creek for 7 miles?

Mr. GERTIN. Exactly.

Mr. TAWNEY. How much has the back water from the lake raised the level of that creek?

Mr. GERTIN. As far as I got at the measurement, there is a small creek that runs as a drainage through the place, and that is always dry after the spring snow goes away. When I put a stick on it it ran between  $4\frac{1}{2}$  and 5 feet of water in that little creek.

Mr. TAWNEY. What are the heights of the banks of the creek?

Mr. GERTIN. We may have had from two feet and a half to three feet.

Mr. TAWNEY. So that the creek was out of its banks all the time during the year?

Mr. GERTIN. Yes; the water was low in the banks.

Mr. TAWNEY. I mean that it was out of the banks.

Mr. GERTIN. No.

Mr. TAWNEY. What is it that overflows your land, then?

Mr. GERTIN. I claim that it is the dam that is backing the water.

Mr. MIGNAULT. Is your land actually covered with water now?

Mr. GERTIN. Yes.

Mr. MIGNAULT. Where does that water come from?

Mr. GERTIN. From the backing up of the lake.

Mr. MIGNAULT. The backing up of the lake into the creek?

Mr. GERTIN. Yes.

Mr. MIGNAULT. Therefore, the creek must overflow its banks to get on your land?

Mr. GERTIN. Yes.

Mr. TAWNEY. Then this back water raises the level of the creek more than 3 feet for a distance of 7 miles up from the lake, does it?

Mr. GERTIN. Yes.

Mr. TAWNEY. You said the banks were three feet high.

Mr. GERTIN. When there was no water it would run probably two and a half or three feet in some places.

Mr. TIBBETTS. That was before the erection of the dam?

Mr. GERTIN. Yes, sir.

Mr. TIBBETTS. When did this flooding first take place, Mr. Gertin?

Mr. GERTIN. I guess it first took place in 1912. Of course, I can not really remember just exactly the dates as I never marked them down.

Mr. TIBBETTS. What crops had you gotten on that land prior to that flooding?

Mr. GERTIN. I figured that I got 10 tons of hay off it.

Mr. TIBBETTS. That is, to the acre, do you mean?

Mr. GERTIN. No; 10 tons off what was flooded. Of course, I never weighed the hay, and I just put it at that.

Mr. TIBBETTS. Since that time what have you gotten?

Mr. GERTIN. I have gotten none.

Mr. TAWNEY. What kind of hay did you raise on that land?

Mr. GERTIN. It was mostly timothy. There may have been a little wild hay. It is hard to get rid of wild hay altogether. It will come up in spite of you. No matter how high the land is, you will get a certain amount of wild grass that will come up anyway.

Mr. TAWNEY. Did you ever have any trouble with quack grass?

Mr. GERTIN. No; this is what we call blue-joint hay.

Mr. TIBBETTS. Have you had any timber destroyed by the flooding?

Mr. GERTIN. Yes; there was timber destroyed. Of course, it is in the water. Once it gets in the water, it dies anyway. When the water gets around them the wind comes along and keeps blowing them and they go over.

Mr. TIBBETTS. What class of timber is on that land that is flooded?

Mr. GERTIN. Poplar, balm of Gilead, balsam, and some spruce, and there may be an odd birch or so.

Mr. TIBBETTS. Can you give us an idea of the timber that has been destroyed?



Mr. GERTIN. There might be 75 cords, or something like that; maybe more. Of course, I have not gone over it to take any close estimate of it. I just put it at that as a guess. I can not very well get around in the water.

Mr. GEORGE. In what year did you say you located upon this land?

Mr. GERTIN. I do not know whether it was 1901 or 1902.

Mr. GEORGE. When did you receive the patent for it?

Mr. GERTIN. I think it was about 1907; somewhere along there. I did have it ready, but I did not bring it with me.

Mr. GEORGE. I was just going to ask you for it.

Mr. GERTIN. I had it with me the last day I was in, and I took it out of my pocket and I forgot all about it.

Mr. GEORGE. If my learned friend Mr. Tibbetts, will consent, I will produce a certified copy of the original patent, together with a certificate of ownership of this land from the custody of a master of titles for the district of Rainy River, later on in the afternoon.

Mr. TAWNEY. Do you question his ownership of the land?

Mr. GEORGE. No.

Mr. TAWNEY. There is no necessity of putting that in the record, is there?

Mr. MIGNAULT. We have not insisted on the strict rules of proving titles. We are not concerned with the individual cases. It does not matter whether he owns the land or not. The question is, How much land is overflowed and what is the value of the land, no matter to whom it belongs?

Mr. GEORGE. In this particular case, Mr. Commissioner, there is another point involved. I wish to put in evidence the contract between the power company and the Ontario Government of the 9th of January, 1905, wherein it is stated that all locators of land who have not received patent can have no right of damages against anyone for the flooding of land by reason of the construction of the dam. The question as to the exact time of the location of the land and the time when the land is patented is relevant to that point upon the construction of the agreement, and I merely wish to file both as an exhibit upon that particular question.

Mr. MIGNAULT. Will you put both in?

Mr. GEORGE. Yes.

Mr. ROCKWOOD. I will call attention to the fact that this is the same contract with the Canadian Government which I promised to see was produced for the record, and it is not necessary to repeat it.

Mr. MIGNAULT. Is it already in the record?

Mr. ROCKWOOD. No; I promised that I would produce it for the record, and I intended to call attention to it at the Winnipeg meeting.

Mr. MIGNAULT. You may proceed with the examination of the witness now, Mr. George.

Mr. GEORGE. Mr. Gertin, what was the first year that there was any flooding of your lands on Frog Creek?

Mr. GERTIN. 1912.

Mr. GEORGE. In the year 1910 what was the condition of Frog Creek upon which the land is situated?

Mr. GERTIN. Do you mean with reference to the water?

Mr. GEORGE. Yes.

Mr. GERTIN. It was dry.

Mr. GEORGE. In the year 1911 what was the condition?

Mr. GERTIN. I could not say, but I think the water was a little higher. There was one year that the water was not up quite as high. That may have been in 1911. Of course, I am not exact on those dates.

Mr. GEORGE. At any rate, it was not until the year 1912 that there was any overflowing of the water of Frog Creek on your land?

Mr. GERTIN. 1912 was the year that I figured from.

Mr. GEORGE. Can you tell us what business was being followed along Frog Creek during the winter seasons of 1910 and 1911 and 1911 and 1912? In other words, were there lumbering operations going on?

Mr. GERTIN. Yes.

Mr. GEORGE. What was the condition of the creek in the spring of 1912, in relation to the presence there of timber, logs, ties, poles, and other like materials?

Mr. GERTIN. It was full of timber.

Mr. GEORGE. For how far back from Rainy Lake was it full of timber?

Mr. GERTIN. You might say as far as the creek went. I do not know just exactly how long that creek is.

Mr. TAWNEY. About how far back would you fix it?

Mr. GERTIN. I would judge it must be over 9 miles.

Mr. MIGNAULT. It was full of lumber opposite your property?

Mr. GERTIN. Yes; and my property was full of timber.

Mr. GEORGE. The bed of the creek was full of lumber and there was lumber upon your property?

Mr. GERTIN. Yes; it was rolled in, I guess, 5 or 6 feet high. It was in regular bridges.

Mr. GEORGE. In the year 1911 was the creek full of timber and ties and poles?

Mr. GERTIN. I can not say about the dates. I know it was filled two summers.

Mr. GEORGE. And the lumbermen were unable to drive the creek?

Mr. GERTIN. No; they were not unable to drive the creek.

Mr. GEORGE. Well, did they?

Mr. GERTIN. No; they did not.

Mr. GEORGE. In the year 1912 there was sufficient water in the creek to take out the timber?

Mr. GERTIN. To take out the timber; yes.

Mr. GEORGE. And that was the first year that you complained of any damage?

Mr. GERTIN. Yes.

Mr. GEORGE. Do you remember the occasion of that creek rising during the summer months of that year?

Mr. GERTIN. No.

Mr. GEORGE. When did it start to rise so as to overflow your land?

Mr. GERTIN. In 1912.

Mr. GEORGE. What time in 1912?

Mr. GERTIN. I could not just say. I know I went down and the water was over the bank.

Mr. GEORGE. You went down when?

Mr. GERTIN. I went down, but I do not know just exactly what time it was. I came in here and told them.



Mr. GEORGE. Was it in the middle of the summer?

Mr. GERTIN. I guess it was getting on to pretty near the middle of the summer anyway. I guess June is supposed to be in the summer, is it not? I guess it was nearly June, anyway.

Mr. MIGNAULT. How long did it last in 1905?

Mr. GERTIN. It lasted right along.

Mr. MIGNAULT. During the whole summer?

Mr. GERTIN. Yes.

Mr. MIGNAULT. Your land was flooded during the whole summer of 1905?

Mr. GERTIN. Yes.

Mr. MIGNAULT. Was it as badly flooded as it is now?

Mr. GERTIN. Just as badly as it is now; in fact, in the fall it is even higher.

Mr. GEORGE. That is, in the fall of 1912 it was even higher than it is now?

Mr. GERTIN. No; I say that in the fall the water is generally higher than in other months.

Mr. GEORGE. I am speaking of the fall of 1912.

Mr. GERTIN. In 1912 it was just the same as it is now.

Mr. GEORGE. Was it higher then than it is now?

Mr. GERTIN. No.

Mr. GEORGE. It was higher in the fall of 1912 than what it is now?

Mr. GERTIN. No; I say that in the fall the water is even higher than it is in the summer time.

Mr. GEORGE. Will you just answer my question.

Mr. GERTIN. That is what I am trying to do.

Mr. GEORGE. I am drawing your attention particularly to the fall of 1912 and to the height of the water at that time in relation to the height of the water now.

Mr. GERTIN. It was the same as it is now.

Mr. MIGNAULT. You say that in the year 1905 the water was as high as it is now?

Mr. GERTIN. In 1912.

Mr. MIGNAULT. But I am speaking of 1905.

Mr. GERTIN. I do not know anything about 1905.

Mr. MIGNAULT. My questions were with regard to the year 1905.

Mr. GERTIN. We had no water at that time.

Mr. MIGNAULT. I asked you whether the water was high in the creek in 1905, and I understood you to say that it was.

Mr. GERTIN. No.

Mr. MIGNAULT. So you misunderstood me?

Mr. GERTIN. I misunderstood you.

Mr. MIGNAULT. You thought I was referring to the year 1912?

Mr. GERTIN. Yes.

Mr. GEORGE. Then, do you say that in the year 1905 the water did not overflow the banks of Frog Creek at your place?

Mr. GERTIN. No.

Mr. GEORGE. Did it in 1904?

Mr. GERTIN. No.

Mr. GEORGE. Did it in any year from the time you were located upon the land up to the year 1912?

Mr. GERTIN. There is a ravine where one year the water did rise when we were making hay and it wet a few cocks of hay.

Mr. MIGNAULT. What year was that?

Mr. GERTIN. I could not tell you just what year that was.

Mr. MIGNAULT. That would not be in the year 1905?

Mr. GERTIN. It might be back in there; but I paid no attention to it. I happened to be in town here and I mentioned about the water coming up so quickly and going down, and they told me it was a dam that had broken loose. I did not know where the dam was.

Mr. GEORGE. Was there not a dam on Frog Creek?

Mr. GERTIN. Yes; there is a dam on Frog Creek.

Mr. GEORGE. In what years was that dam operated?

Mr. GERTIN. That was before it came into the settlement.

Mr. GEORGE. Did it hold the water back at any time during the time you were located on these lands?

Mr. GERTIN. No; that was before that.

Mr. GEORGE. At any rate, you say that in June of 1912 the water commenced to rise so as to give sufficient water to run the timber out of Frog Creek?

Mr. GERTIN. No; there was sufficient water to run the timber before 1912.

Mr. GEORGE. Do you know for what other reason Frog Creek was not run by the lumbermen?

Mr. GERTIN. As far as I understand it, they did not want the timber out.

Mr. GEORGE. Do you remember the nature of the rainfall in the month of June, 1912?

Mr. GERTIN. No; I do not know anything about the rainfall.

Mr. GEORGE. But, at any rate, in the summer of 1912 the water rose up over your land, and that was the first time since you had been located there?

Mr. GERTIN. That was the first time.

Mr. GEORGE. What time did the lumbermen drive the creek?

Mr. GERTIN. In the spring.

Mr. GEORGE. Was the timber in the creek at the time your lands were covered with water?

Mr. GERTIN. I really do not know whether the timber was there or not.

Mr. GEORGE. It has been suggested, Mr. Gertin, that this timber in Frog Creek in the year 1912 dammed the water back in the creek and overflowed your land. What do you say as to that?

Mr. GERTIN. I can not see it at all.

Mr. MIGNAULT. You do not agree with that?

Mr. GERTIN. No; but there is no timber in it now, and it is back just the same, so we can not blame the timber for it.

Mr. GEORGE. Taking the ordinary route of travel, Mr. Gertin, from the town of Fort Frances, what distance do you travel by ordinary Government road to get back to your farm?

Mr. GERTIN. By the road that we take now I do not know just exactly how far it is. It might probably be 6 miles around.

Mr. GEORGE. What is the condition of the road?

Mr. GERTIN. The road is not bad with the exception of probably half a mile.



Mr. GEORGE. That is, for a portion of the distance it is gravel and the rest of it goes through a new country?

Mr. GERTIN. Yes; it is ditched and graded. There is about half a mile of it there that is a kind of muskeg. That is the worst piece of it.

Mr. GEORGE. When you gave evidence that your farm was 3 miles from Fort Frances, what did you mean?

Mr. GERTIN. That is the way we are going now. I said that it would run probably 3 miles to my place now.

Mr. MIGNAULT. In a straight line?

Mr. GERTIN. That is straight by the road we take in the winter, but if the other line was opened through there I suppose it might run a little more than that. There are other lines that are not opened.

Mr. GEORGE. But if you follow the ordinary route of the Government road it is 6 miles?

Mr. GERTIN. Yes. I would not swear as to whether it is 6 miles or not.

Mr. GEORGE. You live in what is known as the Frog Creek settlement?

Mr. GERTIN. I do not know whether we are counted as being in the Frog Creek settlement or not.

Mr. GEORGE. How far are you from Rainy Lake?

Mr. GERTIN. I would judge that it might probably be 7 miles up there. I have never measured it.

Mr. GEORGE. How far are you back from the river?

Mr. GERTIN. I do not know anything about Rainy River.

Mr. MIGNAULT. It would be about the same distance as from Fort Frances.

Mr. GERTIN. I do not know. You see we are away north from Rainy River.

Mr. GEORGE. You have given the commissioners the value of R. H. Martin's farm on Rainy River, and I want to know the distance of that farm from your farm.

Mr. GERTIN. I could not just exactly give the distance. I know it is not very far.

Mr. GEORGE. Mr. Martin asked you to buy an acre there, you say, for \$150.

Mr. GERTIN. Yes; for \$150.

Mr. GEORGE. What was the acre to be used for?

Mr. GERTIN. He did not say. He just wanted me to buy it. He said he thought it was a good investment.

Mr. GEORGE. You did know, did you not, that Mr. Martin, whose farm is on Rainy River, was subdividing it for residential purposes?

Mr. GERTIN. No.

Mr. GEORGE. Do you not know it now?

Mr. GERTIN. No; I do not.

Mr. GEORGE. Do you not know that it is located upon the best highway in this country and is adjacent to water privileges and electric-light privileges, and that it is now being occupied by people who purchased acre lots at the price you mentioned?

Mr. GERTIN. I do not know, because a man could have bought more than 1 acre if he wanted to.

Mr. GEORGE. Answer the question, please. Do you not know those facts in relation to this land?

Mr. GERTIN. No; I do not.

Mr. GEORGE. How far would you say Mr. Martin's land is from Fort Frances, along the Rainy River?

Mr. GERTIN. I could not even tell you that.

Mr. GEORGE. How long have you lived in this country?

Mr. GERTIN. Sixteen years.

Mr. GEORGE. Would you say that it was more than 3 miles from Fort Frances along the river?

Mr. GERTIN. I would not unless I found out.

Mr. GEORGE. Do you not know that it adjoins, within a few rods, the Biddison subdivision of Fort Frances?

Mr. GERTIN. I know it is back in there somewhere.

Mr. GEORGE. And that there is there located a fine new school?

Mr. GERTIN. I know there is a school in McErwin.

Mr. MIGNAULT. You do not claim that your land is as valuable as that of Mr. Martin?

Mr. GERTIN. I have not figured that it would be as valuable as his. I have not said it was, either. Still, in time probably it will be. If I had a good road right across, I would figure it was pretty close to it.

Mr. GEORGE. You know, of course, that the Martin property is subdivided for residential homes along the river front?

Mr. GERTIN. I do not know it. It is a part of the country I have not been in. I stay around my own place mostly. I never travel around very much.

Mr. GEORGE. Where is this acre that he was going to sell you for \$150?

Mr. GERTIN. I did not ask him where it was.

Mr. MIGNAULT. Did you go to see it?

Mr. GERTIN. No; I did not.

Mr. MIGNAULT. So you did not consider the offer to sell?

Mr. GERTIN. No; I was not thinking about buying.

Mr. GEORGE. Do you know of any sales of land in that immediate vicinity of your farm; that is, of cultivated land in the Frog Creek district?

Mr. GERTIN. I do not know of any sales. I know of some who have land to sell.

Mr. GEORGE. You have told the commissioners that you had your property under option for \$6,000. When was that?

Mr. GERTIN. I could not tell you the date.

Mr. GEORGE. Can you tell me the year?

Mr. GERTIN. No; I can not.

Mr. GEORGE. Can you tell me the name of the man who held the option?

Mr. GERTIN. Cassidy was the man.

Mr. GEORGE. W. W. Cassidy. Do you know why he held the option?

Mr. GERTIN. I do not know.

Mr. GEORGE. Do you not know that he secured the option from you at a time that there were discoveries of iron being made in the immediate vicinity of your farm, and that he wanted the land for the iron located upon it?



Mr. GERTIN. There is no iron on mine.

Mr. GEORGE. Is there any on the farm immediately adjoining yours?

Mr. GERTIN. No.

Mr. GEORGE. Is there any within a radius of a mile?

Mr. GERTIN. I dare say there was.

Mr. GEORGE. Do you not know that there was?

Mr. GERTIN. Within a mile; yes.

Mr. GEORGE. Within less than a mile?

Mr. GERTIN. No; I do not know that there is any within less than a mile.

Mr. GEORGE. In what year was the iron boom in Crozier Township?

Mr. GERTIN. I could not tell you.

Mr. GEORGE. You knew that W. W. Cassidy was interested in securing options upon land that might possibly turn out to have iron quartz upon it?

Mr. GERTIN. He may have been.

Mr. GEORGE. Do you not know that he was?

Mr. GERTIN. No.

Mr. GEORGE. Do you know why he wanted it, then?

Mr. GERTIN. No; I do not.

Mr. GEORGE. Then you do not know that he wanted it for agricultural purposes?

Mr. GERTIN. No.

Mr. GEORGE. Was he particularly interested in this little 12 acres that you complain of as being overflowed?

Mr. GERTIN. No.

Mr. GEORGE. Then it was not the meadowland that he wanted?

Mr. GERTIN. Of course, I do not know what he wanted. It was just on the whole place. That was all.

Mr. MIGNAULT. The option was never taken up—he never bought?

Mr. GERTIN. No; he never bought. There were 107 acres that I could have sold and could have gotten cash for. That was an offer from a gentleman on this side. I do not know whether the man's name was Blackmore or what it was.

Mr. GEORGE. That was about the same time, Mr. Gertin?

Mr. GERTIN. Yes; I could have sold that for cash then.

Mr. GEORGE. The iron boom has fallen through in that county, has it not? You hear nothing of it now?

Mr. GERTIN. I do not say that it has fallen through.

Mr. GEORGE. I say, you hear nothing of it now?

Mr. GERTIN. No.

Mr. MIGNAULT. Were the people to whom you say you could have sold the land interested in the iron boom?

Mr. GERTIN. Well, probably they were looking forward to it; I would not say. But, of course, this place that I was speaking of, it was not the lower place that was drowned that I say I was offered that money for.

Mr. GEORGE. This particular place that you say is drowned out you never received any offer for?

Mr. GERTIN. I had an offer of \$6,000 on that—not on that particular place, but on the whole farm.

Mr. GEORGE. How much of the farm is high and dry above the bank?

Mr. GERTIN. Of which farm?

Mr. GEORGE. Of the farm that you speak of above those 12 acres of lowland.

Mr. GERTIN. It is all high and dry with the exception of 15 acres that are drowned.

Mr. GEORGE. Who cleared those 15 acres?

Mr. GERTIN. I cleared them myself.

Mr. GEORGE. You are sure that that land was not cleared when you located there?

Mr. GERTIN. No.

Mr. GEORGE. Was there any clearance on your land when you went there?

Mr. GERTIN. No. There were a few of the trees cut down when they run the lock in when we had the dam there, but I burned the logs myself.

Mr. GEORGE. There was no meadowland upon which hay had been cut upon this location before you went on it?

Mr. GERTIN. No.

Mr. TIBBETTS. What has it cost to clear land in your vicinity, Mr. Gertin?

Mr. GERTIN. Well, it will run, I guess, from \$65 to \$100. I have land there that you can not clear under \$100 an acre; that is, to go right in and clear it.

Mr. TIBBETTS. Just to put it in shape for cultivation?

Mr. GERTIN. Yes. If a man could go in and clear it and leave his stumps lie, he could do it for less.

Mr. TIBBETTS. Mr. Gertin, do you know a man by the name of Gilbert who owns a farm in that neighborhood?

Mr. GERTIN. I do.

Mr. TIBBETTS. Do you know what he paid for his farm?

Mr. GERTIN. There is one that I believe he gave \$2,000 for.

Mr. TIBBETTS. How long ago was that?

Mr. GERTIN. I could not just exactly tell you how long ago that was.

Mr. TIBBETTS. As compared with yours, what sort of a farm is that that Mr. Gilbert paid \$2,000 for?

Mr. GERTIN. There is a big difference in the two farms. One is sand and the other is clay loam.

Mr. TIBBETTS. Which is sandy?

Mr. GERTIN. The one he paid \$2,000 for. He has two farms there. One he is asking \$5,000 for.

Mr. TIBBETTS. What have you to say about the one for which he paid \$2,000?

Mr. GERTIN. That is the one where I say the sand is.

Mr. TIBBETTS. How does that compare in value with yours?

Mr. GERTIN. There would be quite a big difference, because I would not want it at all as far as a farm goes.

Mr. TIBBETTS. How far is that from your place?

Mr. GERTIN. It is just 1 mile this side of me. There would be only half a mile between the two. There is one lot in between.



Mr. GEORGE. The farm which cost Mr. Gilbert \$2,000 is nearer to Fort Frances than your farm is?

Mr. GERTIN. It may be.

Mr. GEORGE. Well, is it?

Mr. GERTIN. Yes.

Mr. GEORGE. It is on a gravel road, I believe?

Mr. GERTIN. No; it is on a part gravel road.

Mr. TAWNEY. How many acres are there?

Mr. GERTIN. I could not say how many acres of land he has.

Mr. GEORGE. You told my learned friend that it cost \$100 to clear an acre of your land.

Mr. GERTIN. Yes; it will cost that.

Mr. GEORGE. Upon what do you base that estimate of cost?

Mr. GERTIN. For the underbrush and chopping of it and taking out the stumps.

Mr. GEORGE. Did you ever get a contract for clearing land at \$100 an acre?

Mr. GERTIN. I never did. I know of one man that got one. He took a piece of land out there for \$25 an acre and he did not have to take stumps out or anything else; the brush was all burned off and he did not make anything out of it.

Mr. TAWNEY. Was your price of \$100 an acre based upon the proposition of pulling the stumps out by hand or by the use of a stump puller?

Mr. GERTIN. I do not know. We blow all ours out, although I have taken pretty near all my stumps out with a pry.

Mr. GEORGE. Do you not know of land that has been cleared there in the last year?

Mr. GERTIN. Yes—Frazier's; and he told me it cost him over \$100 an acre.

Mr. GEORGE. Within the last year?

Mr. GERTIN. Within two years.

Mr. GEORGE. To whom did he let the contract?

Mr. GERTIN. He did it himself, and hired men.

Mr. GEORGE. Do you know of any contracts being let for the clearing of land within the last two years?

Mr. GERTIN. No.

Mr. GEORGE. Do you not know that land has been cleared within 4 miles of Fort Frances, upon contract, at \$12.50 an acre?

Mr. GERTIN. I dare say there might be; yes. Maybe there was not any timber on it, though.

Mr. GEORGE. Do you know that timberland has been cleared for \$12.50 per acre and grubbed and left ready for the plow?

Mr. GERTIN. I do not know that. I know I never could get it done.

Mr. GEORGE. Do you know a man by the name of Charles Muckleberg?

Mr. GERTIN. I know him; yes.

Mr. GEORGE. Do you know that he has cleared a lot of land by contract within the last two years?

Mr. GERTIN. I know nothing about it.

Mr. GEORGE. You have never seen his farm?

Mr. GERTIN. No; but there is a big difference in farm land. I can not get those men. When I am clearing land I can not get them to do it.

**TESTIMONY OF JOHN A. WILSON, OF MISCAMPBELL TOWNSHIP,  
ONTARIO.**

JOHN WILSON, after being duly sworn, testified as follows:

Mr. TAWNEY. What is your full name?

Mr. WILSON. John A. Wilson.

Mr. TAWNEY. Where do you reside?

Mr. WILSON. On Frog Creek, in Miscampbell Township.

Mr. TIBBETTS. Do you know the Gertin farm?

Mr. WILSON. Yes.

Mr. TIBBETTS. Do you know the extent of the flooding on it, Mr. Wilson?

Mr. WILSON. As far as I can judge, there are 15 acres of drowned land altogether; that is, timbered, and what land is cleared.

Mr. TIBBETTS. What do you consider the cleared land worth that is covered with water?

Mr. WILSON. I should judge that it ought to be worth \$75 an acre, anyway.

Mr. TIBBETTS. What do you say as to the bush land that is covered with water?

Mr. WILSON. About \$35 to \$40; it ought to be worth that much, anyway; that is, with the timber.

Mr. GEORGE. That is, if there is nothing done to the land, but if it is in the ordinary state of nature, it would be worth \$35 to \$45 per acre?

Mr. WILSON. Yes.

Mr. TAWNEY. Does that include the timber?

Mr. WILSON. Yes; it includes the timber.

Mr. GEORGE. So that a location in that section would be worth on the day when the locator went on it, in your opinion, \$5,000 for 160 acres?

Mr. WILSON. That is the whole farm?

Mr. GEORGE. Yes.

Mr. WILSON. Yes.

Mr. GEORGE. Is that what you base your evidence upon?

Mr. WILSON. Yes.

Mr. GEORGE. Do you say, as the former witness said, that it is worth \$100 an acre to clear the land?

Mr. WILSON. I would not exactly say that it would cost \$100. It might cost a little less. Of course, the land he got is pretty hard land to clear. The timber is all big.

Mr. GEORGE. Were those 12 acres of lowland heavily timbered?

Mr. WILSON. I could not exactly say. The stumps were out of most of the land when I was there.

Mr. GEORGE. When did you first see it?

Mr. WILSON. Five years ago.

Mr. TAWNEY. Do I understand that the municipality of Fort Frances desires to be heard further in regard to these interests?

Mr. MURRAY. Yes; we are ready now.



**TESTIMONY OF DR. ROBERT MOORE, OF FORT FRANCES, ONTARIO.**

Dr. ROBERT MOORE, having been duly sworn, testified as follows:

Mr. TAWNEY. What is your full name?

Dr. MOORE. Dr. Robert Moore.

Mr. TAWNEY. Where do you reside?

Dr. MOORE. In Fort Frances, Ontario.

Mr. TAWNEY. Do you hold any official position in the municipality?

Dr. MOORE. I do. I am the mayor.

Mr. MURRAY. Dr. Moore, how long have you been residing in Fort Frances?

Dr. MOORE. Between 18 and 19 years.

Mr. TAWNEY. Mr. Murray, last September we heard representatives of the municipality of Fort Frances on certain phases of this matter. Are you familiar with that testimony?

Mr. MURRAY. Yes, sir; during the interim I have had an opportunity to go over the testimony. I expect to present some new aspects of the matter.

Mr. TAWNEY. I just wanted to avoid duplication of testimony.

Mr. MURRAY. This map is one that was produced and put in evidence by Mr. Wright last September, Mr. Wright then being the town engineer of Fort Frances.

Mr. MIGNAULT. The map is already in evidence?

Mr. MURRAY. Yes, sir.

Mr. MIGNAULT. Do you remember the reference number?

Mr. MURRAY. It does not appear to have any reference number in the testimony as recorded here, unless it is indexed at some place where I have not seen it.

Mr. MIGNAULT. You refer to it as the map put in by Mr. Wright.

Mr. MURRAY. Doctor, as to the proposed elevation of the water to the 500 bench mark, in what way would that affect the town, in your opinion, in relation to Water Street and otherwise?

Dr. MOORE. It would affect it both in regard to the water front as it exists now and the water from the north that no one is saying anything about. Starting at the end of the wing there above the canal, the land falls away so that the present level of the water is practically at the roots of the grass. The level character of the land would make any rise cover the surface for some distance back. That condition persists more or less at Victoria, Armit, and Crowe Streets, and it falls away at about No. 150 on Crowe Street. Beyond that I do not think that the land surface will be flooded until you get away east to the creeks.

This will be the principal matter: There are several spots where the natural rise would still maintain dry land. One is between Portage Avenue and Victoria Street. There would still be dry land there and on up until about No. 161 or 162, when the lowland stretches away inland and does not return again to the river bank until we get to about 150 and 151. In this part [indicating on the map] it exists, perhaps, for 200 or 300 feet back, so that if the present level were increased to the extent of 3 feet all of that 150 or 200 or perhaps 300 feet near Armit Avenue would be under water and much more rendered marshy.

Mr. MIGNAULT. When you speak of the present level, what level do you mean?

Dr. MOORE. I mean the 497 bench mark.

Mr. TAWNEY. How is the shore along the river front there affected by the present level?

Dr. MOORE. To explain that fully, I would say that the land here is simply lake bottom dried and underneath is a blue clay, and above that it is overlaid by sandy surface. As long as it is in that blue clay the damage is not so great. Once it rises above that, the sand naturally mills away.

Mr. TAWNEY. Certainly; but what is the relative position of the present level of the blue clay?

Dr. MOORE. It is above the blue clay.

Mr. TAWNEY. How much?

Dr. MOORE. You see at these points that I pointed out the blue clay rises. In these waves the blue clay is still above water level.

Mr. TAWNEY. To what extent does the wave action due to the transportation of boats affect the shore line there?

Dr. MOORE. Of course, every boat that passes throws a wave more or less severe into that sand there.

Mr. TAWNEY. That would be true even if the level were down to 495?

Dr. MOORE. Yes; but not so effective, because it would throw it into clay which will wash only slowly.

Mr. MURRAY. To what extent is the alteration in the present stages of the bank due to the present level over what there was when you were first acquainted with the river bank?

Dr. MOORE. It has washed in considerably; I could not say how much, but very considerably. It is mostly noticeable on these short lots. Some of them are partly washed away; whereas there was a foreshore allowance outside of this 18 years ago. What we understand by foreshore allowance is a chain above high water before land is measured for sale purposes. That foreshore is washed away there and it probably is in various places all along.

Mr. TAWNEY. To what extent has the river front there been affected by erosion?

Dr. MOORE. To that extent that I speak of.

Mr. TAWNEY. Has any considerable amount of it been washed away?

Dr. MOORE. It would be 66 feet of the foreshore. It is now into the surveyed town street allowance in places.

Mr. MIGNAULT. Do you mean to say that in places 66 feet of the shore has been washed away?

Dr. MOORE. I believe so; and from that on down.

Mr. MIGNAULT. As much as 66 feet.

Dr. MOORE. Yes.

Mr. MIGNAULT. Where would that be?

Dr. MOORE. I was indicating this as a point where I knew that the foreshore had washed away.

Mr. MIGNAULT. When you say "this," what do you mean?

Dr. MOORE. That is between Portage Avenue and Victoria Street where the land is high.



MR. TAWNEY. How far does it extend? Give the distance in feet, if you can.

DR. MOORE. I can not give you that distance in feet.

MR. TAWNEY. What is the scale of that map?

MR. MURRAY. These maps are 66 feet.

DR. MOORE. If that is true, we can figure it out. It would be 660 feet in that particular section that we are speaking about.

MR. TAWNEY. I wanted to find out the distance that the shore was washed away for 66 feet.

DR. MOORE. I think all of that distance it is practically washed back that far.

MR. TAWNEY. It would be about 660 feet?

DR. MOORE. Much more than that. That is the high land, remember. That land is about 8 feet above water level to-day, and yet that has washed the most.

MR. MIGNAULT. What has been the effect on the lowland?

DR. MOORE. It has been similar.

MR. MIGNAULT. How much has been washed away?

DR. MOORE. The foreshore is entirely washed away. There is a spot in the block between Victoria Street and Armit Avenue. In those places the foreshore, 165 feet, washed away into the 66-foot street allowance, and in some places even a portion of that.

MR. MIGNAULT. Has Front Street been affected?

DR. MOORE. In spots it has become affected.

MR. MURRAY. The bend shows the erosion.

MR. MIGNAULT. Opposite Armit Avenue?

DR. MOORE. Yes; and opposite lots 68 and 69. It has run in there on the street allowance. It has eaten up the whole of the foreshore lots.

MR. MURRAY. What do you say about the condition of the streets with regard to the wetness?

DR. MOORE. On Armit Avenue the water is backed up. It is also backed up at the next street—Crowe Street.

MR. MIGNAULT. The street there is practically on water level?

DR. MOORE. Yes.

MR. MIGNAULT. The water extends upon the street?

DR. MOORE. Yes; on the grass.

MR. TAWNEY. Are there any docks in the vicinity of where the greatest erosion has occurred?

DR. MOORE. No; but the fact is that the building of docks has hindered the erosion.

MR. MURRAY. Pithers Point to the east, Doctor, is a park, is it not?

DR. MOORE. Yes.

MR. TAWNEY. We went over that very fully last September, did we not?

MR. MURRAY. Yes. Then, Doctor, you were speaking about the conditions to the north and the muskeg.

DR. MOORE. I think we will have to take into account the fact that what we call the muskeg is just a glacial basin filled with material more or less rotten, and that the surface material of that vegetable matter is only about  $3\frac{1}{2}$  feet above the 497 elevation; that is to say, if the water were raised  $3\frac{1}{2}$  feet it would come to the actual level and would have nothing to hinder it but a spongy mass of moss

from filtering through and doing damage from the north. The north will be the next point where we will have great difficulty, and the north part of the whole town, at least as far east as the pumping house, will be rendered swampy.

Mr. MURRAY. I might state for the benefit of the commission that to the north of the town and the railroad tracks there is a large tract of muskeg. Haymarsh Bay and Rainy Lake bound that on the north. As the witness says, the elevation of the water to the 500 bench mark would so raise the water of Rainy Lake that there would be a considerable amount of seepage across the town proper. Dr. Moore, there has been no diking here along the water front, as yet?

Dr. MOORE. No.

Mr. MIGNAULT. Is there any diking anywhere?

Dr. MOORE. Well, Russells have some in front of their works.

Mr. MURRAY. That is private, is it not?

Dr. MOORE. Yes; it is their own work. Of course that has put an end to any erosion there.

Mr. MIGNAULT. That is opposite lots 72 and 73?

Dr. MOORE. Yes; they did that for their own protection.

Mr. GEORGE. Dr. Moore, you say you have lived in the town of Fort Frances for upwards of 18 years?

Dr. MOORE. No; because there was no town of Fort Frances 18 years ago; it was a municipality.

Mr. GEORGE. The town of Fort Frances was incorporated in 1904, I believe. Can you tell us when the town of Fort Frances acquired the land known as Pithers Point?

Dr. MOORE. I could not swear to it; no. I know it was recently.

Mr. GEORGE. Within the past four years?

Dr. MOORE. Well, I would not be able to swear to it. It was recently.

Mr. GEORGE. Within the past five years?

Dr. MOORE. I presume so; yes.

Mr. GEORGE. From whom did they acquire it?

Dr. MOORE. It is rented from the Indian department.

Mr. GEORGE. Then they lease it from the Dominion Government?

Dr. MOORE. From the Indian department, not from the Dominion Government.

Mr. GEORGE. From the Superintendent of Indian Affairs?

Dr. MOORE. Well, from his department.

Mr. GEORGE. And the town now holds it under lease?

Dr. MOORE. They now hold it under lease; yes.

Mr. GEORGE. And it was obtained within the past five years?

Dr. MOORE. Of course, I do not swear to the time.

Mr. GEORGE. It was since the dam was constructed by the Ontario & Minnesota Power Co.?

Dr. MOORE. Yes.

Mr. GEORGE. This street that you refer to and the foreshore constitutes public property?

Dr. MOORE. I do not think the foreshore is. I think that is Dominion land, unless it has been transferred.

Mr. GEORGE. The street is property belonging to whom?



Dr. MOORE. To the town of Fort Frances. I could not swear as to the ownership of the foreshore. That may have been transferred to the town. I have not any knowledge of anything of that kind.

Mr. MIGNAULT. If it does not belong to the town, to whom does it belong?

Dr. MOORE. It belongs to the Dominion Government.

Mr. MIGNAULT. Rather to the Ontario government, does it not?

Mr. GEORGE. It belongs to the Ontario government. At any rate, it is not private property, Dr. Moore.

Dr. MOORE. No; it is not private property.

Mr. GEORGE. This street that you have been referring to, I think you have called Front Street.

Dr. MOORE. That is what I know it as, Front Street.

Mr. GEORGE. It has been known as Front Street since Fort Frances became a town?

Dr. MOORE. Yes.

Mr. GEORGE. Before Fort Frances was incorporated, and in the earlier days of the district of Rainy River, what was that road called?

Dr. MOORE. There was no road there.

Mr. GEORGE. Was there not a road known as the Rainy River Colonization Road all along Rainy River?

Dr. MOORE. Colonization Road started on Front Street of Fort Frances, not that Front Street, but the Front Street which ran from the present Emperor Hotel northward and circulated around at a distance from Rainy River, but it did not touch on Rainy River.

Mr. GEORGE. Then, do you know, as a matter of fact, that in laying out the town of Fort Frances the Government set aside for a road along the river land to the width of 99 feet?

Dr. MOORE. I could not swear to that, but I understand from maps that I have seen that there was a foreshore and a street allowance.

Mr. GEORGE. Within your recollection, have you ever seen the outer portion of that 99 feet above water?

Dr. MOORE. Above water?

Mr. GEORGE. Above water; yes.

Dr. MOORE. I could not say.

Mr. GEORGE. Your recollection runs back for 18 years?

Dr. MOORE. Yes; but still I could not measure distances with my eye to that extent.

Mr. GEORGE. Immediately inside the 99 feet there is private property owned by the various residents of Fort Frances?

Dr. MOORE. Bordering on Front Street. I could not say that that width is 99 feet.

Mr. MURRAY. It is 66 feet, as a matter of fact.

Mr. GEORGE. It is not 66 feet; it is 99 feet. The present Front Street is 66 feet in width after the old township of McErwin deeded 33 feet of it to the Canadian Northern Railway.

Mr. MURRAY. That is from Victoria Street west and not beyond that.

Mr. GEORGE. Dr. Moore, at any time in your recollection of 18 years, have you ever seen the water up on this street called Front Street?

Dr. MOORE. I have.

Mr. GEORGE. How many times would you say the water has been up on Front Street, within your knowledge?

Dr. MOORE. Only once that I am sure of.

Mr. GEORGE. Whereabouts was it on Front Street?

Dr. MOORE. It was up on the end of Mosher Avenue.

Mr. GEORGE. That would be on the corner of Sinclair Street, would it not?

Dr. MOORE. It was really opposite that.

Mr. TAWNEY. In what year was that?

Dr. MOORE. In 1897, when there was a cloudburst and the whole country was under water.

Mr. GEORGE. But you remember the year 1904, and the height of the water in that year in relation to this Front Street?

Dr. MOORE. No; I could not remember by years at all. I remember that year because it was my first year.

Mr. GEORGE. Do you know the house owned by John Knauff at the corner of Nelson Street and Front Street?

Dr. MOORE. Yes.

Mr. GEORGE. Did you ever see the water in front of that house and entirely across the street and in the ditch adjoining the private property?

Dr. MOORE. Yes; but there was no grading at that time; the center of the street had not been raised; it was just the natural level of the grass.

Mr. GEORGE. So that the town raised the street to keep out the water?

Dr. MOORE. Of course, I could not say that.

Mr. GEORGE. Until the town raised the street it would frequently become flooded by the ordinary level of the river?

Dr. MOORE. I do not think so. I have no recollection of but the one year.

Mr. GEORGE. What year was that?

Dr. MOORE. 1897, in July.

Mr. MIGNAULT. That was the year of the cloudburst?

Dr. MOORE. Yes.

Mr. MIGNAULT. Do you recollect what the stage of the water was in 1904 or 1905?

Dr. MOORE. No, I do not; but it was nothing remarkable. At that time it was remarkable because with the falls here the water went straight over; there was nothing but just a line of froth to indicate where the falls were. The docks were all under water and the steamboats were tied up to trees on the high banks. They could not land anywhere. The water was up to the fourth row of shingles on the warehouses. It has never occurred since.

Mr. GEORGE. Have you any particular recollection, Doctor, as to the height of the water in 1904?

Dr. MOORE. No, I have not. I do not remember anything remarkable except in the one year.

Mr. GEORGE. But you do remember the water at various times being up on Front Street before it was graded?

Dr. MOORE. I can not say that I can swear to that. I do remember that it has been in the ditch since it was graded. I think I have recollection of the border of the grass being covered to a few feet at



the same location, that is Mosher Avenue, but not extending any distance back. I would not swear to that.

Mr. GEORGE. In your 18 years' experience in Fort Frances have you not seen Pithers Point covered with water?

Dr. MOORE. In 1897.

Mr. GEORGE. In no other year?

Dr. MOORE. I have seen it, of course, since the dam was built over there.

Mr. GEORGE. Have you not seen Pithers Point in such condition that it was navigated within the point during the 18 years you have been here?

Dr. MOORE. There is a low channel there like a creek, and we always went up there in a canoe.

Mr. GEORGE. I do not mean the canoe channel.

Dr. MOORE. I do not either; I mean a low place inside the trees.

Mr. GEORGE. That has been sufficiently high to be navigable?

Dr. MOORE. Yes; but that is a low place. The agents put a dam in there and stopped it.

Mr. MIGNAULT. Is that all, Mr. George?

Mr. GEORGE. That is all, except that I wish to put in a copy of the contract of the 9th of January, 1905, between His Majesty, represented by the honorable the commissioner of Crown lands for the Province of Ontario, and Edward Wellington Backus, of the city of Minneapolis, in the State of Minnesota, lumberman, and those associated with him, wherein the town of Fort Frances is represented as being an interested party to the agreement.

Mr. MIGNAULT. Is that a certified copy?

Mr. GEORGE. This is not a certified copy, but I can produce the original, or the duplicate original, and this has been compared with it. We can not, however, leave the duplicate original with you.

Mr. MIGNAULT. You state that it is a correct copy?

Mr. GEORGE. I so state.

Mr. MURRAY. I can hardly see how it affects the town; the town is not a party to the agreement.

Mr. MIGNAULT. No; but it will go in for what it is worth. You do not raise any technical objection because the contract is not certified?

Mr. MURRAY. No; not if the contract is a true copy. This paper seems to be a parallel line copy of two agreements.

Mr. GEORGE. Yes; there was a first agreement and they changed it.

Mr. MIGNAULT. You put this in on behalf of the Ontario & Minnesota Power Co.?

Mr. GEORGE. Yes.

Mr. MIGNAULT. We will call that "Ontario & Minnesota Power Company Exhibit A."

Mr. GEORGE. I have also a certified copy of the patent that was issued to Mr. Adolphus Gertin. It is certified by the local master of titles and is under the seal of his office. I have also a certificate of search as to this land, in which are set forth the day of location and the date that the patent was issued, the patent having been issued in 1910 instead of 1907, and as Mr. Gertin testified.

Mr. MIGNAULT. The certified copies of the letters patent to Mr. Gertin will be marked "Ontario & Minnesota Power Company Ex-

hibit B" and the certificate of search will be marked "Ontario & Minnesota Power Company Exhibit C."

### TESTIMONY OF COLIN RUSSEL, OF FORT FRANCES.

COLIN RUSSEL, having been duly sworn, testified as follows:

Mr. MIGNAULT. What is your occupation?

Mr. RUSSEL. Machinist.

Mr. MIGNAULT. Where do you live?

Mr. RUSSEL. On Third Street, Fort Frances.

Mr. MURRAY. You are a member of the firm of Russel Bros.?

Mr. RUSSEL. Yes.

Mr. MURRAY. You are the owners of the property marked "Russel Brothers Dock," on this plan?

Mr. RUSSEL. Yes.

Mr. MURRAY. And boat railway?

Mr. RUSSEL. Yes.

Mr. MURRAY. And lots 72 and 73; your shops are there?

Mr. RUSSEL. Yes; 69, 72, 73, and 74.

Mr. MIGNAULT. This is the plan of the town of Fort Frances, already put in.

Mr. MURRAY. The property belongs to Mrs. Russel, I believe?

Mr. RUSSEL. Yes.

Mr. MURRAY. That is your mother?

Mr. RUSSEL. Yes.

Mr. MURRAY. How long have you lived in Fort Frances?

Mr. RUSSEL. Since January, 1907.

Mr. MURRAY. Since that time, to what extent has Front Street in the front of your property been affected by the construction of the dam and the maintenance of the water to the 497 bench mark?

Mr. RUSSEL. Well, right where this railway is shown here up till last spring there was 18 feet of it washed away from the time that we purchased the property; we purchased that property in 1910; from 1910 up to last spring there was 18 feet of it washed away.

Mr. MURRAY. Eighteen feet of the land washed away?

Mr. RUSSEL. Yes.

Mr. MURRAY. And what is the condition of Front Street with reference to travel?

Mr. RUSSEL. The water was up over the street and the town graveled it and raised it up higher; it is above the water level now.

Mr. MURRAY. What would be the result if the water level were raised to the 500 bench mark; it would be 3 feet higher, referring now not only to Front Street, but to lot 69, to say Crow Street?

Mr. RUSSEL. There would be practically between 2 and 3 feet of water over the land.

Mr. MURRAY. I believe your mother's residence, the one you have been living in, is on lot 69?

Mr. RUSSEL. Yes.

Mr. MURRAY. That would mean that all this property would be submerged and practically useless for any purpose?

Mr. RUSSEL. It would.

Mr. MURRAY. What do you value lot 69 at, with the residence on it?



Mr. RUSSEL. The property alone?

Mr. MURRAY. The lot with the house?

Mr. RUSSEL. \$3,500.

Mr. MURRAY. And lots 72 and 73, on which your shops are?

Mr. RUSSEL. Seventy-two, seventy-three, and seventy-four?

Mr. MURRAY. Yes; the lots your shops are on?

Mr. MIGNAULT. Are those lots affected by high water?

Mr. MURRAY. At present the water is not into the lots; two years ago it was into the lots; it was somewhere between 6 and 10 inches higher than it is to-day.

Mr. MIGNAULT. For how long a time was it into the lots?

Mr. RUSSEL. Most of the summer.

Mr. MURRAY. During that period the water was about the level of the crest of the dam?

Mr. RUSSEL. It was running over.

Mr. MURRAY. The crest of the dam is 497; so far as excavations for cellars are concerned, can you excavate at the present time for cellars?

Mr. RUSSEL. No.

Mr. MURRAY. Is there a cellar in your residence now?

Mr. RUSSEL. There is a hole under the kitchen just now, with a drop in it; that hole has been filled up; there was a hole there probably 2 feet deep, and it was always full of water, and you could not fill it up.

Mr. MURRAY. So that you could not excavate for a cellar at all?

Mr. RUSSEL. No.

Mr. MIGNAULT. Unless you built a cement cellar?

Mr. RUSSEL. You would have to build a waterproof cement; it is pretty hard to do.

Mr. GEORGE. Or build a sewer.

Mr. MURRAY. Then your boat railway would be destroyed with any increase in the level?

Mr. RUSSEL. Yes; any increase in the level.

Mr. MURRAY. What is the value of your property here in connection with the boat railway mentioned?

Mr. RUSSEL. Well, the property there——

Mr. MURRAY. Take it by lots; there is 72 and 73 in which your shop is built; take that by itself?

Mr. RUSSEL. Including the railway and the shop buildings and the land, it is worth about \$10,000.

Mr. MURRAY. And do you include lot 74 in that?

Mr. RUSSEL. Yes.

Mr. MURRAY. That is, lots 72, 73, and 74 and the railway and buildings?

Mr. RUSSEL. Yes.

Mr. MURRAY. About \$10,000?

Mr. RUSSEL. Yes.

Mr. MIGNAULT. Has it lost any of its value due to the high stages of the water?

Mr. RUSSEL. Yes, it has from a business standpoint.

Mr. MIGNAULT. How much?

Mr. RUSSEL. The property south of the street there, of which we have a lease of occupation from the Crown, has been washed away

until it is almost—well, we fixed it up to store boats on, and there is some of that that is washed away.

Mr. MIGNAULT. That is part of the foreshore?

Mr. RUSSEL. Yes.

Mr. MIGNAULT. Which you had leased from the town?

Mr. RUSSEL. No; from the Crown.

Mr. MURRAY. It is part of your business repairing motor boats and constructing boats?

Mr. RUSSEL. Yes; motor boats and boats of all descriptions.

Mr. GEORGE. This 18 feet of land which you say was washed away is on the river side of Front Street?

Mr. RUSSEL. It is.

Mr. GEORGE. Front Street is a passable thoroughfare in front of your property, is it not?

Mr. RUSSEL. Yes.

Mr. GEORGE. It is a graveled road?

Mr. RUSSEL. It is.

Mr. GEORGE. And teams and conveyances and automobiles pass up and down?

Mr. RUSSEL. Yes.

Mr. GEORGE. The property which you spoke of as being outside or on the river side of Front Street is property which is owned by the Crown of Ontario?

Mr. RUSSEL. We have it under lease.

Mr. GEORGE. It is vested in the Crown in the Province of Ontario?

Mr. RUSSEL. Yes.

Mr. GEORGE. And you have what is known as a license of occupation of certain river lots?

Mr. RUSSEL. Yes.

Mr. GEORGE. These lots are all under water, are they not?

Mr. RUSSEL. We also have the shore rights.

Mr. GEORGE. Have you your license of occupation with you?

Mr. RUSSEL. No, I have not.

Mr. GEORGE. When was it granted?

Mr. RUSSEL. We have two licenses of occupation, one in front of lots 72, 73, and 74, and the other one in front of lots 69, 70, and 71.

Mr. GEORGE. The two licenses of occupation take in all the property in the river between two streets?

Mr. RUSSEL. No; from lot 69 to 74, both inclusive.

Mr. GEORGE. It runs in front of five lots?

Mr. RUSSEL. Yes; six lots.

Mr. GEORGE. The date of the license of occupation is what?

Mr. RUSSEL. The date of the one in front of lots 72, 73, 74, I think is 1910, and the other one is a later date, I think 1914; either 1913 or 1914.

Mr. GEORGE. At any rate, the license of occupation was issued after the agreement with the power company of 1905?

Mr. RUSSEL. Yes.

Mr. GEORGE. And after the construction of the dam?

Mr. RUSSEL. No; the first license, I think, was prior to the completion of the dam.

Mr. GEORGE. What do you mean by the completion of the dam in relation to time?



Mr. RUSSEL. Well, when they completed the dam they started to raise the water.

Mr. GEORGE. You say your first license of occupation was issued in 1910?

Mr. RUSSEL. I think it was 1910. We constructed the Marine Railway the spring before the power company completed their dam, and we had the license of occupation then.

Mr. GEORGE. But the dam itself was completed before 1910, was it not?

Mr. RUSSEL. I do not think so; I do not think the water was held back until then.

Mr. GEORGE. I am not speaking about the rise in the level of the river, because it apparently has no reference to the completion of the dam. The dam was completed prior to 1910, was it not?

Mr. RUSSEL. What do you mean by "completed"?

Mr. GEORGE. The masonry of the dam up to the 497 bench mark was complete and electricity was being sold from the power house on the Canadian side.

Mr. RUSSEL. We built our railway prior to that, whatever date it was.

Mr. GEORGE. At any rate, your first license of occupation was in 1910?

Mr. RUSSEL. It might have been prior to that, because we built the railway when the water was about 12 feet—the water raised about 12 feet the summer that we built the railway.

Mr. MURRAY. Perpendicular, you mean?

Mr. RUSSEL. Yes.

Mr. MIGNAULT. The dam was under construction when you built the railway?

Mr. RUSSEL. Yes.

Mr. MIGNAULT. You knew the water would be raised?

Mr. RUSSEL. Yes; the water was very low that spring, and when the dam was completed and the water was held back, the level of the river was raised about 12 feet. Ordinarily it raised a good many feet without the dam between spring and high water.

Mr. GEORGE. You say in the summer of 1910 the water raised some 12 feet?

Mr. RUSSEL. I am not sure of the date, but the summer of the year we put in that marine railway. It was put in on dry land, and you can measure how deep the water is over that now.

Mr. GEORGE. In that year it was very low water all through the summer?

Mr. RUSSEL. Yes.

Mr. GEORGE. This license of occupation gives you no interest whatever in the soil and is revokable at will, I believe?

Mr. RUSSEL. The license itself may not give us an interest in the land, but we have an interest in the land.

Mr. GEORGE. It is a permit issued by the minister of crown lands, temporary only, and revokable at any time?

Mr. RUSSEL. Yes.

Mr. GEORGE. You say you have an interest in the land; you mean the land on the north side of Front Street?

Mr. RUSSEL. On the south side as well.

Mr. GEORGE. Where do you get the interest in the land south of Front Street?

Mr. RUSSEL. From the Ontario Government.

Mr. GEORGE. How?

Mr. RUSSEL. The same way as we got the lease of occupation.

Mr. GEORGE. Where is your title?

Mr. RUSSEL. It is at home at present.

Mr. GEORGE. In what form is it?

Mr. RUSSEL. It is stated in the license of occupation.

Mr. GEORGE. It is stated in the license of occupation?

Mr. RUSSEL. Yes; it describes the property south of Front Street to the river's edge and between those two points.

Mr. TAWNEY. Does it give you anything more than the right to occupy the land during the life of the lease?

Mr. RUSSEL. I do not suppose so; I do not remember the wording of it.

Mr. MIGNAULT. Is the lease revocable at any time?

Mr. RUSSEL. Yes; it is at the pleasure of the Crown.

Mr. GEORGE. There is no title you have to this land other than that?

Mr. RUSSEL. No.

Mr. GEORGE. I believe there is a sewer on the street just back of your property, is there not; on Sinclair Street?

Mr. RUSSEL. I do not know; there may be.

Mr. GEORGE. What is the depth of land between Front Street and Sinclair Street at the point where your machine shop is?

Mr. RUSSEL. About 300 feet.

Mr. MURRAY. It is more than that.

Mr. RUSSEL. Our lot behind the machine shop, lot No. 71, is about 175 feet deep, and the lot directly behind it would be about the same depth; that would make 350 feet.

Mr. GEORGE. So that if there is a sewer on that street you are within 350 feet of the sewer in Fort Frances?

Mr. RUSSEL. About that.

Mr. GEORGE. Now, in connection with your business, you have told my learned friend that you are in the business of repairing boats—gasoline boats?

Mr. RUSSEL. Yes.

Mr. GEORGE. And you had several marine railways along the water's edge?

Mr. RUSSEL. We have had two.

Mr. GEORGE. And at this particular time on the river front there would be a great many boats at that particular point on the river bank?

Mr. RUSSEL. They bring them there for repairs, or do you mean for storage?

Mr. GEORGE. For repairs, for storage, to secure gasoline, or for any purpose for which they would come to a machine shop?

Mr. RUSSEL. Yes.

Mr. GEORGE. So that there would be more boats at that particular point on the river bank than any other point along the entire front at Fort Frances?

Mr. RUSSEL. Yes; sometimes there certainly is.



Mr. GEORGE. That was your business?

Mr. RUSSEL. Yes.

Mr. GEORGE. And you know what the result has been during the past few years along this river front by the operation of the small gasoline boats?

Mr. RUSSEL. Say that again.

Mr. GEORGE. You know what the result has been of the operation of small gasoline boats along the river front in Fort Frances?

Mr. RUSSEL. The effects on the shore?

Mr. GEORGE. Yes.

Mr. RUSSEL. Yes.

Mr. GEORGE. What has been the result?

Mr. RUSSEL. The effect of washing away the bank.

Mr. GEORGE. The land in front of your machine shop is very low in the ordinary state of nature?

Mr. RUSSEL. It is a little bit lower than the adjoining land.

Mr. GEORGE. That is, it slopes from the east, from quite a high ridge at Stinson's place, to very low in front of your machine shop?

Mr. RUSSEL. No, not very low; it slopes down; I do not know what the height would be above the river at Stinson's, but it is lower than at our place.

Mr. GEORGE. And it was lower when you built your machine shop there?

Mr. RUSSEL. Yes.

Mr. GEORGE. And it is one of the low spots of the river front in Fort Frances, is it not?

Mr. RUSSEL. Yes.

Mr. MURRAY. The effect of the motor boats on the river bank is very much greater when the river is high, is it not, than when it was at its normal level?

Mr. RUSSEL. Yes; of course boats coming to the machine shop for repairs are naturally, when they come there, running slower, and, though a greater number will probably land at our dock than any one point along the river, they come there under reduced speed, and would not make the damage to the property right there that they would when running at full speed.

Mr. TAWNEY. How high is the bank there above the present level, or does the river come up with the level of the land?

Mr. RUSSEL. There might be 6 inches above what it is to-day.

Mr. TAWNEY. Is it not a fact that the effect of the wave action on the bank is greater when the river is below the level of the bank than it is when the waves wash up over the top?

Mr. RUSSEL. The bank has washed away more while the river was high than when it was low.

Mr. MURRAY. The river to-day is nearly to 497; it is pretty high just now?

Mr. RUSSEL. Yes, it is pretty high.

Mr. TAWNEY. I see, Mr. Rockwood, that at page 316 of the record of testimony taken at International Falls last September, in the evidence of Mr. Wright, you state:

I shall also want to supply the commission with a copy of that contract between the Ontario government under which the dam was constructed—

Mr. ROCKWOOD. That is the contract.

MR. TAWNEY. Is the copy supplied by Mr. George the same one?

MR. ROCKWOOD. Yes. I asked Mr. George to produce it.

MR. TAWNEY. I simply want to identify that contract as the one Mr. George produced.

### TESTIMONY OF MR. JOHN B. WRIGHT.

JOHN B. WRIGHT, having been duly sworn, testified as follows:

MR. MIGNAULT. Were you here last September?

MR. WRIGHT. Yes.

MR. MIGNAULT. Did you give evidence?

MR. WRIGHT. Yes.

MR. MURRAY. You are a member of the council of the town of Fort Frances?

MR. WRIGHT. Yes.

MR. MURRAY. And have been for many years?

MR. WRIGHT. Three years, going on four.

MR. MURRAY. Longer than that, is it not?

MR. WRIGHT. Going on four years.

MR. MURRAY. You are also Indian agent?

MR. WRIGHT. Yes.

MR. MIGNAULT. You can shorten this very much by putting to the witness the question on the point you wish to prove.

MR. TAWNEY. He testified fully last September.

MR. MURRAY. I wanted to ask him about the proposed elevation in relation to Pithers Point. What would the effect of the proposed level to 500 bench mark have on Pithers Point?

MR. WRIGHT. Referring to my previous testimony given before the commission on the 10th of September, 1915, I state that the raising of the water to the 500 bench mark would practically wipe away Pithers Point.

MR. MURRAY. Do you know anything about the continued erosion of the bank along Front Street with reference to the telephone poles on the street?

MR. WRIGHT. I have not been taking much notice, but there is some of the poles that are expected to go in next spring, if something is not done to protect them—the telegraph poles and the electric.

MR. MURRAY. The poles along the street are dropping into the bank?

MR. WRIGHT. Yes; some places it is 8 or 10 feet in on the street line and some places more than that. Another thing I want to say—I do not know whether I put it in my remarks last year—in regard to our Indian school up on the lake shore; if the water is raised to the 500 bench mark, it will cut out the sewerage there and drown out the basement of the school; so that it would be a big damage to that. That building has cost us over \$75,000. I am not objecting to the 497, but anything over that I say is ruinous to us.

MR. GEORGE. When you say "ruinous to us," what do you mean?

MR. WRIGHT. I mean the Indian department.

MR. GEORGE. Are you speaking now under instructions from the Indian department?

MR. WRIGHT. Not this time. I was instructed before to appeal.



Mr. GEORGE. This time you are appearing in what capacity? In the capacity of councillor for the town of Fort Frances?

Mr. WRIGHT. Yes; and as Indian agent for the Indians on the reserve, although not under instructions.

### TESTIMONY OF MR. JURA STINSON.

JURA STINSON, having been duly sworn, testified as follows:

Mr. MURRAY. What property do you own on the river front?

Mr. STINSON. Well, the property is only partly owned by me, because it is an estate.

Mr. MURRAY. You represent an estate?

Mr. STINSON. Yes.

Mr. MURRAY. What lots?

Mr. STINSON. Thirteen and fourteen.

Mr. MURRAY. Thirteen and fourteen on the plan produced?

Mr. STINSON. Yes; 61 and 62; just 4 lots.

Mr. MURRAY. To what extent has the bank been eroded during the last two years? This plan is dated October, 1914?

Mr. STINSON. I should judge last year it went in 8 or 10 feet. I can not swear to it; it is just my estimate.

Mr. MURRAY. The bank is high here?

Mr. STINSON. Yes; much higher than the rest.

Mr. MURRAY. How long have you lived there?

Mr. STINSON. It is 18 years about—17 or 18 years, I think.

Mr. MURRAY. Has there been any considerable washing away of the bank since the dam was built, in your personal observation?

Mr. STINSON. Yes; quite a bit. Of course I never measured it and could not tell.

Mr. MURRAY. Is that washing away continuous every year?

Mr. STINSON. Yes.

Mr. MURRAY. And the 8 or 10 feet you speak of this year, is that more than the usual washing away since the water has been maintained at the present level?

Mr. STINSON. No, I do not think it is any more than usual; of course, if a person kept track of it they could be sure.

Mr. MURRAY. You are speaking now from your general observation?

Mr. STINSON. Yes.

Mr. MURRAY. Do you notice anything in relation to the telephone and electric light poles on the street, whether or not they are being undermined or not?

Mr. STINSON. Well, of course the water is getting closer to them all the time when the bank falls away.

Mr. MIGNAULT. On what side of the street are they?

Mr. STINSON. The right-hand side.

Mr. MIGNAULT. The river side?

Mr. STINSON. Yes.

Mr. GEORGE. No questions.

Mr. MURRAY. I ask the commissioners to permit me to put in the evidence taken before the court of assize last spring at the trial of the indictment against the power company for maintaining a nuisance by reason of the flooding of Front Street. This is the official re-

porter's notes of the evidence. The power companies were defendants, and the indictment was on behalf of the King by the town of Fort Frances.

Mr. MIGNAULT. Why do you want to put it in?

Mr. MURRAY. It takes up the question of damage and erosion, etc., pretty fully; so that I think if we would put it in it would save time. It is between the same parties.

Mr. TAWNEY. Is this the case referred to in the evidence last September?

Mr. MURRAY. Yes.

Mr. TAWNEY. Was that case prosecuted to a final conclusion?

Mr. MURRAY. No; it was prosecuted and went to trial and resulted in a disagreement, I believe, one juror hanging out for acquittal.

Mr. GEORGE. That is not proved.

Mr. TAWNEY. Inasmuch as the case did not result in a final conviction it would hardly be competent for us to receive it.

Mr. MURRAY. It is testimony, that is all.

Mr. MIGNAULT. Unless it goes in by consent, I think we can not accept it. It is testimony which was given before a court, and the commission, while it has power to summon witnesses and hear them, could hardly receive evidence given outside before another court.

Mr. TAWNEY. I would not put my objection to it on that ground as much as I would on the fact that the testimony was rejected by the jury.

Mr. GEORGE. There is a further point, that Judge Lennox, although he allowed the case to go to the jury, reserved many questions of law for his decision, which, on account of the verdict of the jury not being as expected by my learned friend, he was not called upon to decide, and did not decide.

Mr. TAWNEY. I think Mr. Mignault's point is well taken, that, having authority to call witnesses and subpoena witnesses, if necessary, it would not be competent for us to receive this testimony.

Mr. MIGNAULT. There is a further point, that this is merely a committee of the commission, instructed to come to International Falls and receive evidence; and this is not evidence received by us, but evidence taken before another court, so that it would not be competent for us, under the order instructing us to receive evidence, to allow this to be put in the record.

Mr. MURRAY. I do not wish to press it unduly. That is all the evidence I have to offer.

Mr. TAWNEY. If it were evidence, I think we would have to accept it, and would have no discretion.

Mr. MIGNAULT. I would merely say, in addition to what I have said, that the whole commission will sit in Winnipeg on the 1st of February, and if you desire to make any application to the commission you are at liberty to do so; but my view, and the view of my brother Tawney, is that under the order appointing us we would not have authority to receive any testimony except that which we have taken ourselves.

Mr. EVANS. I represent the Canadian Northern Railway, and I wish to ask the commission if we could have a hearing in Winnipeg relative to certain matters placed before the commission at its last sitting by Mr. Moodie, one of our engineers.



Mr. TAWNEY. Certainly you could, as far as I am concerned.

Mr. EVANS. I understood it was set aside for the power interests, but owing to the snow blockade it was impossible for us to be here.

Mr. TAWNEY. We have modified our decision, to suit the convenience of the people on this side of the line.

Mr. MURRAY. There is a gentleman here who represents a mill owner on the other side of Pithers Point, and he would like to be heard as to damage.

Mr. TAWNEY. We will take his evidence.

### TESTIMONY OF RICHARD LOCKHARDT.

RICHARD LOCKHARDT, having been duly sworn, testified as follows:

Mr. MURRAY. You are a member of the firm of Lockhardt Bros.?

Mr. LOCKHARDT. Lockhardt & Co. (Ltd.).

Mr. MURRAY. Proprietors of sawmills?

Mr. LOCKHARDT. Yes.

Mr. MURRAY. Situated where?

Mr. LOCKHARDT. Rocky Inlet.

Mr. MURRAY. To what extent would the elevation of the water to the 500 bench mark affect the mills?

Mr. LOCKHARDT. Do you mean if the water were raised to the 500 bench mark?

Mr. MURRAY. Yes.

Mr. LOCKHARDT. That would be 3 feet higher than it is at present high-water mark?

Mr. MURRAY. Yes.

Mr. LOCKHARDT. Well, it would be just 3 feet too high for us now; it is just right now.

Mr. MIGNAULT. You are not complaining of it as it is?

Mr. LOCKHARDT. No, not as it is; I think it is beneficial as compared with what it has been formerly.

Mr. MIGNAULT. And 3 feet more would do what?

Mr. LOCKHARDT. Well, we could not operate our sawmill. It would drown it partially.

Mr. MIGNAULT. Have you a pretty considerable investment there?

Mr. LOCKHARDT. Yes; quite a considerable investment.

Mr. MIGNAULT. In round numbers, what?

Mr. LOCKHARDT. About \$50,000; that is, in sawmill plant.

Mr. GEORGE. When you say the water at present level is beneficial, what do you mean?

Mr. LOCKHARDT. Well, the water being maintained at a fairly uniform level in the lake we find has been beneficial in our operations.

Mr. GEORGE. It is beneficial to navigation?

Mr. LOCKHARDT. It is.

Mr. GEORGE. And beneficial to the lumbering operations?

Mr. LOCKHARDT. Yes.

Mr. SAMUELSON. You would not say it was beneficial to the farmers on the lower side of the lake, whose lands have been placed under water by reason of maintaining the water at that point?

Mr. LOCKHARDT. Well, of course, if their land is submerged and it is destroyed for raising hay or agricultural purposes, I suppose the farmers there sustained loss.

Mr. SAMUELSON. They are sustaining the same loss you would sustain if the water were raised 3 feet; in other words, drowned out?

Mr. LOCKHARDT. Well, I guess that is about how it would be.

Mr. SAMUELSON. And you would not consider you were benefited if the water were raised 3 feet more than it is now?

Mr. LOCKHARDT. Oh, we could not stand it at all without sustaining big loss.

Mr. SAMUELSON. It would wipe it out of existence, as a going concern, in the operations you are conducting?

Mr. LOCKHARDT. That is the idea.

Mr. MURRAY. Could you get another site just as convenient?

Mr. LOCKHARDT. When you come to build a spur off the Canadian Northern and put up a building, it is just like starting another operation; it is a new proposition.

Mr. MURRAY. That is all the evidence.

Mr. TAWNEY. I understand that concludes the testimony of the people on this side of the line, and if you have any testimony to offer, Mr. Rockwood, we are ready.

Mr. ROCKWOOD. Mr. Richardson is ready, but I have to suggest this, that we have lost pretty much all the afternoon we thought we were going to have, and I can not say how much it is possible to accomplish, or how much will be omitted, if there is no testimony taken after to-day, and I desire simply that the question of future evidence be left open, whether more shall be taken or not.

Mr. TAWNEY. Would it be possible for you to go on as far as you can and, if possible, hear the remaining testimony at Winnipeg?

Mr. ROCKWOOD. That may be possible; that might be arranged.

Mr. TAWNEY. I understood that you had an expert from our State university on the various kinds of grasses that are grown along the shores of this lake and also the shores of the Lake of the Woods.

Mr. ROCKWOOD. I do not know whether it applies to the Lake of the Woods; we have no samples from there; it is possible that it would, but we can not make the connection.

Mr. TAWNEY. I was not going to ask you to make the connection, but I was going to ask if his testimony would not relate generally to the evidence of the engineers—

Mr. ROCKWOOD. It will relate to the samples put before them, and we will first show where those samples have come from.

Mr. TAWNEY. Inasmuch as we took up the State lands first, it might be well to follow along the same lines we followed taking the testimony on the other side. The attorney general is still here, and I understand he desires to get away this evening.

Mr. RICHARDSON. We shall lose a large number of witnesses at 6 o'clock at night; they have been here and have come at great trouble and expense. If we start on the State proposition, we will not get anywhere else, and will not even finish that.

Mr. TAWNEY. Then proceed as you desire to.

Mr. RICHARDSON. I would suggest that if the committee cared to hear Mr. Ralph, who is a very experienced man—great acquaintance in this district—perhaps it would be wisest and best to hear from him first.

Mr. TAWNEY. I think so.



Mr. SAMUELSON. Do I understand that there will be no testimony as to values by the other side at all at this session?

Mr. TAWNEY. I do not know.

### TESTIMONY OF GEORGE A. RALPH.

GEORGE A. RALPH, having been duly sworn, testified as follows:

Mr. TAWNEY. You were before the commission on the Lake of the Woods investigation when the commission met at International Falls, in September, 1912, and at Warroad, in September, 1912?

Mr. RALPH. Yes.

Mr. TAWNEY. Your qualifications as an engineer and your familiarity with the character of the lands were at that time fully explained to the satisfaction of the commission?

Mr. RALPH. What is that?

Mr. TAWNEY. Your experience as an engineer and your acquaintance with the lands bordering on the Lake of the Woods and Rainy Lake and throughout this district were fully gone into at that time?

Mr. RALPH. Yes; I think so. I just appeared before the commission as a representative of the State of Minnesota, and rather gave them my opinion of the condition as to the water level on the Lake of the Woods, but not here at International Falls.

Mr. SAMUELSON. Did I understand the witness to say that he appeared as a witness for the State of Minnesota at that hearing?

Mr. TAWNEY. As the representative of the State. I do not think the witnesses were sworn on that occasion. Are you acquainted with the lands bordering on the south shore of Rainy Lake described in Minnesota Exhibit A and Exhibit B, presented here yesterday by Mr. Preus, the State auditor?

Mr. RALPH. Yes.

Mr. TAWNEY. Have you made any land surveys for the State or the Federal Government of the lands involved bordering on Rainy Lake?

Mr. RALPH. No, sir.

Mr. TAWNEY. You have not?

Mr. RALPH. Not bordering on the lake.

Mr. TAWNEY. Have you any knowledge with respect to lands that are now submerged?

Mr. RALPH. Yes, sir.

Mr. TAWNEY. On the south shore of the Rainy Lake?

Mr. RALPH. Yes.

Mr. TAWNEY. Owned by the State?

Mr. RALPH. Yes.

Mr. TAWNEY. Have you made any estimate of the acreage or areas that are submerged?

Mr. RALPH. Yes, sir.

Mr. TAWNEY. At the different contours, 497 to 500?

Mr. RALPH. In estimating the acreage submerged from contours 494 to 498, and estimates of the State lands that were submerged from 494 to 500 and 501—those estimates are not quite complete as to State lands.

Mr. TAWNEY. What is the estimate of the area that is involved between the contour 494 and 498?

Mr. RALPH. We have not quite completed that estimate yet.

Mr. TAWNEY. Have you completed the area above 498?

Mr. RALPH. No, sir.

Mr. TAWNEY. You can not give the commission any information with respect to the extent of those areas?

Mr. RALPH. No, sir; I can as to private lands.

Mr. TAWNEY. Have you seen the report of Mr. Berg, Settlers' Exhibit A?

Mr. RALPH. No, sir.

Mr. TAWNEY. Have you any record of the names of the private owners of lands on the south shore of the lake who have testified here yesterday and to-day?

Mr. RALPH. Yes, sir.

Mr. TAWNEY. Have you it with you?

Mr. RALPH. Yes, sir; I have it in the court room.

Mr. TAWNEY. If you will get it, I would like to take them up in their order and see what your estimate is as to the amount of lands submerged, as compared with that of Mr. Berg?

Mr. RALPH. We have maps, and each map shows the area submerged between different contours.

Mr. TAWNEY. Will you get it, please?

Mr. RALPH. Mr. Richardson has them.

Mr. RICHARDSON. I have only one copy here.

Mr. TAWNEY. Take the tract of Algot Erickson?

Mr. RALPH. Yes.

Mr. TAWNEY. Are you familiar with that?

Mr. RALPH. Yes.

Mr. RICHARDSON. Here is the blue print of it.

Mr. TAWNEY. That is the east half of the southwest quarter of lot 6, section 27, township 71, range 23?

Mr. RALPH. Yes.

Mr. TAWNEY. Have you made a survey of this particular tract?

Mr. RALPH. Yes.

Mr. TAWNEY. According to your survey, how much of the land is submerged between the contour 494 and 497?

Mr. RALPH. 70.84 acres below contour 494.

Mr. TAWNEY. Below 494?

Mr. RALPH. Yes; and there is 111.04 acres below contour 497; the difference is 40.2 acres.

Mr. TAWNEY. Between 494 and 497?

Mr. RALPH. Yes.

Mr. TAWNEY. Between 497 and 498?

Mr. RALPH. 5.86 acres.

Mr. TAWNEY. What is the total area submerged between 494 and 498?

Mr. RALPH. 46.06 acres.

Mr. TAWNEY. Between 494 and 498?

Mr. RALPH. Yes.

Mr. TAWNEY. Have you the Government meander line there?

Mr. RALPH. I worked to the Government meander line.

Mr. TAWNEY. What is the area between the Government meander line and 494?

Mr. RALPH. It is 70.84 acres.



Mr. TAWNEY. And from 494 up to and including 498, as I understand you, the amount of submerged land is 40 and a fraction acres?

Mr. RALPH. 46.06.

Mr. TAWNEY. Mr. Berg's survey shows 116?

Mr. RALPH. There is 116 acres submerged below 498; there is 116 acres in the area below 494; 116.9.

Mr. TAWNEY. There is only 46.6 of that flooded?

Mr. RALPH. There is only 46.06 of that below, as I said; the other 70 is below 494; part of that land below 489, 1.3 acres; and there is 1.97 acres below 490, and 11.6 acres below 491, and 32.1 acres below 492, and 49.53 acres below 493, and 70.84 acres below 494.

Mr. TAWNEY. Is there any land submerged above 498?

Mr. RALPH. No.

Mr. TAWNEY. There is none.

Mr. RALPH. No.

Mr. TAWNEY. Take Edward Erickson's tract, lots 2, 3, and 4?

Mr. RICHARDSON. That map is not here at present.

Mr. TAWNEY. Have you the map of—

Mr. RICHARDSON. All the maps were here this morning, and I lugged them down. If we went into them, it would take the rest of the time. I brought up one as a sample. They are all done in the same way, and all contain a record of it.

Mr. MIGNAULT. It would be important if we could have them.

Mr. RICHARDSON. Yes; if we had the time.

Mr. MIGNAULT. The committee proposes to sit to-night in order to give you every opportunity to put in the evidence.

Mr. RICHARDSON. I understand that.

Mr. MIGNAULT. With the understanding that if you were not able to complete this evidence, you could do so at Winnipeg.

Mr. RICHARDSON. It would be very difficult to take very many witnesses to Winnipeg from here, and further, I am in the midst of a trial of a jury case, which is adjourned till Tuesday morning, February 1. We have already been trying the case for several days and we go ahead here on the morning of February 1. Mr. Rockwood is not as familiar with the details of these matters as I am, but possibly he could take them up from where we leave off. It is now nearly 5 o'clock. There are witnesses here who must leave to-night on the 6 o'clock train, and if we went into these other features at this time, it would be impossible for them to get away. If at this time I could be permitted to ask Mr. Ralph a few questions, I could lay the foundation for at least two of the other witnesses who, perhaps, could be disposed of before that train went.

Mr. TAWNEY. You are permitted to ask Mr. Ralph any questions you want to.

Mr. RICHARDSON. With regard to those other private tracts, including those of those settlers who have brought suit against the Minnesota & Ontario Power Co., claiming damages for alleged flowage of their lands, have you prepared maps similar to the Algot Erickson map to which you have referred, and from which you have given us your computations of submerged acreage between the different contours?

Mr. RALPH. Yes.

Mr. RICHARDSON. And have they been all accurately prepared?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. Have you taken occasion to go to the various tracts and take samples of material from the tracts in the nature of soil and growth?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. And as you took the herbiage, was it sealed up in envelopes, and has it remained sealed from the time it was taken until yesterday?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. And by whom were the various samples of grasses, sedges, etc., taken from the various properties, opened yesterday?

Mr. RALPH. By a gentleman from the State University, who is in the room; I do not recall his name.

Mr. RICHARDSON. And until that time they were preserved intact in sealed receptacles?

Mr. RALPH. Yes.

Mr. RICHARDSON. To which no one had access?

Mr. RALPH. No.

Mr. RICHARDSON. At the time they were examined by the gentleman from the university, were they returned, respectively, to the same receptacles from which they were taken?

Mr. RALPH. Yes.

Mr. RICHARDSON. You were present during all the time of the examination and saw it done, were you?

Mr. RALPH. Yes.

Mr. RICHARDSON. Was anything else taken by you from the various tracts?

Mr. RALPH. Samples of soil.

Mr. RICHARDSON. And as you took those what was done with them?

Mr. RALPH. We put them in jars and sealed up the jars, and I have the jars.

Mr. RICHARDSON. And have those jars remained continuously sealed from the time they were taken from the respective tracts until now?

Mr. RALPH. Yes.

Mr. RICHARDSON. Will you produce before the commission the various receptacles containing the grasses, sedges, etc.?

Mr. RALPH. Yes.

Mr. SAMUELSON. I object to that on the ground that it is incompetent, irrelevant, and immaterial, that it has no bearing upon the question that is involved before the commission at the present time, merely laying the foundation for the private litigation that is being conducted between these settlers and the parties who have raised the height of water, and can in no manner benefit the commission, or guide the commission, on the question of whether or not the waters of the lake should or should not be raised.

Mr. TAWNEY. I understand he proposes following this by calling an expert who personally examined the samples.

Mr. RICHARDSON. Yes.

Mr. TAWNEY. As to its bearing on the productiveness of the soil and the character of the growth which the soil produces.



Mr. RICHARDSON. And to meet many of those so-called hay questions.

Mr. TAWNEY. The evidence will be received subject to objection.

Mr. SAMUELSON. I further wish to make this objection; that the testimony that has already been produced as to the nature and quality of the land that is now submerged, and if Mr. Ralph's testimony is correct, he did not dive into the water for the purpose of obtaining samples, nor could he possibly obtain any grasses from the submerged areas, there being no claim that either the soil or the grasses were taken from the area now submerged. So that this must necessarily be with reference to other soils and other grasses than those on the submerged land.

Mr. MIGNAULT. You will be able to show that on cross-examination, so that you will have the benefit of that objection. We have decided we will receive the evidence subject to the objection.

Mr. RICHARDSON. Will you produce the receptacle containing the sedges, etc., from the Algot Erikson tract, to which reference has been made?

Mr. RALPH. This is it.

Mr. MIGNAULT. How is that marked?

Mr. RICHARDSON. Marked number 22 by Mr. Ralph. When were these samples obtained by you?

Mr. RALPH. Between the 5th and 10th November, 1915.

Mr. RICHARDSON. The numbers of the receptacles containing the herbage ran from 1 to what?

Mr. RALPH. One to twenty-four.

Mr. RICHARDSON. You may state whether, in each instance, you took a fair sample from the herbage standing and growing on each piece of property at the time?

Mr. RALPH. Yes; we did take a fair sample of the vegetation at the water's edge or about the water's edge.

Mr. RICHARDSON. Do you mean a fair average sample?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. I will ask to have Mr. Ralph withdrawn at this time and Mr. Oswald put on the stand.

Mr. SAMUELSON. Mr. Ralph has made the statement that he took a fair sample. I have had no opportunity to ascertain what particular place it was taken and the conditions, just the mere statement that he has taken a fair sample in the year 1915. I think that is an insufficient basis upon which to base the fact that it was a fair sample.

Mr. MIGNAULT. Possibly, if you are submitting the samples in evidence you should go a little further and show where they were taken.

Mr. RICHARDSON. That will be done, but if I do it now these professors from the university will not be able to give their evidence, because they must take their train. I would call the attention of the committee to the fact that this merely goes to the order of receiving the proof.

Mr. MIGNAULT. What you propose to do is to show these samples to an expert and ask him his opinion as to them——

Mr. RICHARDSON. Ask him what they are.

Mr. MIGNAULT. And then to connect them with particular parcels of land by recalling Mr. Ralph?

Mr. RICHARDSON. Yes.

Mr. MIGNAULT. I think you may do that.

Mr. RICHARDSON. And, further, one professor will identify and characterize and the second will give testimony as to their value as products.

Mr. MIGNAULT. Go on.

Mr. SAMUELSON. I understood the professor was not going till midnight.

Mr. OSWALD. It is the other professor who is going.

#### TESTIMONY OF WIELAND OSWALD, OF MINNESOTA.

WIELAND OSWALD, having been duly sworn, testified as follows:

Mr. RICHARDSON. You are connected with the University of Minnesota?

Mr. OSWALD. Yes.

Mr. RICHARDSON. How long have you been so connected?

Mr. OSWALD. Twelve years.

Mr. RICHARDSON. And you are a graduate of the University of the State of Wisconsin?

Mr. OSWALD. I have taken work both at Wisconsin University and also Minnesota.

Mr. RICHARDSON. And your degree?

Mr. OSWALD. I have only specialized along botanical lines. I have entered as a special student of both universities.

Mr. RICHARDSON. How long since you began to specialize?

Mr. OSWALD. About 14 years.

Mr. RICHARDSON. Have you had practical experience outside of that?

Mr. OSWALD. Yes, sir.

Mr. RICHARDSON. To what extent?

Mr. OSWALD. I was born and raised on a farm in Wisconsin.

Mr. RICHARDSON. Anything else?

Mr. OSWALD. I had some experience on a Canadian farm in Saskatchewan some years ago.

Mr. RICHARDSON. How many seasons?

Mr. OSWALD. Three seasons.

Mr. RICHARDSON. What years?

Mr. OSWALD. I do not recall the years.

Mr. RICHARDSON. You came from the University of the State of Minnesota and arrived here yesterday?

Mr. OSWALD. Yes.

Mr. RICHARDSON. After your arrival, were there submitted to you a number of closed packages which you opened?

Mr. OSWALD. Yes.

Mr. RICHARDSON. And found to contain vegetable matter?

Mr. OSWALD. Yes.

Mr. RICHARDSON. Was Mr. Ralph present and did he submit them to you?

Mr. OSWALD. Yes.

Mr. RICHARDSON. And as you examined them, were they immediately returned to their receptacles and resealed?

Mr. OSWALD. Yes, sir.



Mr. RICHARDSON. I presume the committee would like to follow the order of the list, or is that immaterial?

Mr. TAWNEY. It would be perhaps more convenient in the future consideration of the testimony.

Mr. RICHARDSON. Mr. Ralph can get them out in the order in the list. In the meantime we have the Algot Erickson package, No. 22; will you open that and state if you examined it yesterday, and state what it is?

Mr. OSWALD. Yes; I examined it; it is a sedge.

Mr. RICHARDSON. And what do you mean by a sedge?

Mr. OSWALD. It is a plant that looks very similar to a grass, in fact, it is very closely related; it is very different, however, in several respects; do you want me to state the differences?

Mr. TAWNEY. What is its value as compared to hay?

Mr. OSWALD. I am not qualified to testify as to values.

Mr. RICHARDSON. Prof. Thatcher will supply that. You asked as to whether you should distinguish?

Mr. OSWALD. Yes.

Mr. RICHARDSON. You may do so.

Mr. OSWALD. From the ordinary layman's point of view a sedge and a grass differs particularly in this point, that a sedge has a solid triangular stem, while a grass has a hollow round stem; there are other technical differences which I do not imagine it would be necessary to go into.

Mr. RICHARDSON. What is the botanical name of this particular sedge?

Mr. OSWALD. That I could not tell; the material was insufficient to determine the species.

Mr. RICHARDSON. What is the next one on the list, Mr. Ralph?

Mr. RALPH. No. 24, Coxon.

Mr. RICHARDSON. Will you open 24?

Mr. OSWALD. Also a sedge.

Mr. RICHARDSON. Will your testimony given as to No. 22 apply to that?

Mr. OSWALD. Yes; also a sedge.

Mr. RALPH. No. 23, Carl Erickson.

Mr. RICHARDSON. Look at that, Professor.

Mr. OSWALD. Blue joint grass.

Mr. RICHARDSON. What do you mean blue joint?

Mr. OSWALD. There are three or four varieties of blue joint grass species; that is very common in swamps in Minnesota. It is a fairly tall grass and gets its name from its bluish joint and also bluish leaves.

Mr. RICHARDSON. Are there any other kinds of blue joint besides this swamp blue joint?

Mr. OSWALD. There is a grass which is commonly called blue joint that grows on high lands, that belongs to an entirely different genus; it belongs to the genus that quag grass belongs to. The peculiarity of common names is that very often a common name is a localized thing. If I could give botanical names I could give them more technically.

Mr. TAWNEY. Is there any difference in the blue joint on high land and the Canoka blue grass?

Mr. OSWALD. Oh, yes.

Mr. RICHARDSON. What is the botanical name of sample No. 23?

Mr. OSWALD. Calamograstis.

Mr. RICHARDSON. Give the botanical name of the high-land grass?

Mr. OSWALD. Agropyron Smithii.

Mr. RICHARDSON. What is the next number?

Mr. RALPH. No. 21, Clifford Demars.

Mr. OSWALD. There was no flower head or seeds on this sample, and the closest I could identify it was that it is a grass; it is not a sedge but a grass; that is, 21.

Mr. RICHARDSON. As to what kind, you are unable to say?

Mr. OSWALD. I am unable to say.

Mr. RICHARDSON. Is there anything to indicate whether it is a swamp grass or upland grass?

Mr. OSWALD. No, sir; I thought possibly there might be some of the muck with it.

Mr. RICHARDSON. Nothing that you can ascertain from its coarseness?

Mr. OSWALD. No; I could not tell you.

Mr. RICHARDSON. The next specimen?

Mr. RALPH. No. 20, John Ferguson.

Mr. OSWALD. This was like the preceding one; grass is all I could determine this. I might state here that there are thousands of varieties of grass very closely related, and that we just grabbed a bunch from the soil. It is an absolute impossibility to determine some of its specific genus.

Mr. RICHARDSON. The next number?

Mr. RALPH. No. 19; that is Oulson.

Mr. RICHARDSON. Will you examine that and state what it is, Professor?

Mr. OSWALD. Yes; it has an indication of a lowland grass, owing to the muck that is hanging to the roots.

Mr. RICHARDSON. And the next number?

Mr. RALPH. No. 18; and that was taken on some land that was——

Mr. RICHARDSON. Are you not following this list of names?

Mr. RALPH. No; we can not follow it. That is not on any land on which there is a suit pending.

Mr. RICHARDSON. What is the name of the man?

Mr. RALPH. Edward Mott.

Mr. OSWALD. This is also insufficient material, except to determine it as a grass.

Mr. RICHARDSON. And the next number?

Mr. RALPH. No. 17; Byron M. Weberg.

Mr. OSWALD. No. 17 included a species of sedge and bluejoint; there were two specimens in this envelope.

Mr. RICHARDSON. Is that the same general bluejoint that you have referred to before?

Mr. OSWALD. Yes.

Mr. RICHARDSON. And as to the sedge; is it the same sedge?

Mr. OSWALD. Oh, I do not know; I do not remember what the other one was; I could not determine the sedge any more than just sedge.

Mr. RICHARDSON. And the next number?



Mr. RALPH. No. 16; Bert T. Pease.

Mr. RICHARDSON. Will you examine that and state what it is?

Mr. OSWALD. It is a sedge.

Mr. RICHARDSON. And the next number?

Mr. OSWALD. No. 15; that is also a sedge.

Mr. RALPH. That is William Fars.

Mr. RICHARDSON. And the next number?

Mr. OSWALD. No. 14 is bluejoint grass.

Mr. RALPH. Herman Lumker.

Mr. RICHARDSON. Is that the same kind of bluejoint?

Mr. OSWALD. Yes.

Mr. RICHARDSON. And the next?

Mr. OSWALD. No. 13.

Mr. RALPH. Gilbert Carlson.

Mr. RICHARDSON. What is that, Professor?

Mr. OSWALD. Also bluejoint.

Mr. RICHARDSON. And the next number?

Mr. RALPH. No. 12, R. H. Bennett.

Mr. RICHARDSON. What is that?

Mr. OSWALD. Bluejoint grass.

Mr. RICHARDSON. And the next number?

Mr. RALPH. No. 11, Sproul.

Mr. OSWALD. It is a sample of iris, sometimes called a blue flag—neither a sedge nor a grass. It is a wild species of our cultivated variety.

Mr. RICHARDSON. Is it the sweet flag?

Mr. OSWALD. No; that is a different thing.

Mr. RALPH. No. 10 is also Rufus Sproul.

Mr. OSWALD. That is a bluejoint grass.

Mr. RICHARDSON. And the next?

Mr. RALPH. No. 9, Daisy B. Clarke.

Mr. OSWALD. No. 9 is a rush.

Mr. RICHARDSON. What is the difference between a rush and a sedge?

Mr. OSWALD. This rush belongs very closely to the sedge family, except it has more or less of a roundish stem.

Mr. RALPH. No. 8 is Alice M. Clarke.

Mr. OSWALD. That is a sample of what is sometimes called swamp blue grass, but perhaps a better name would be false redtop.

Mr. RICHARDSON. And the next number?

Mr. OSWALD. No. 7 is bluejoint grass.

Mr. RALPH. That is the Gault land; there are three or four heirs.

Mr. RICHARDSON. And the next?

Mr. OSWALD. No. 6 contains two specimens—one a cat-tail and the other a sedge.

Mr. RICHARDSON. And the name of 6?

Mr. RALPH. Hattie Barton.

Mr. RICHARDSON. And the next?

Mr. OSWALD. No. 5; that is a sedge.

Mr. RALPH. Frederick Heineman, and No. 4 we have lost.

Mr. RICHARDSON. And the next is what?

Mr. OSWALD. No. 2 I was unable to identify further than a grass.

Mr. RALPH. That is Tom Watson.

Mr. RICHARDSON. And you are unable to identify it because of the absence of material?

Mr. OSWALD. Yes, sir. No. 3 is what we call swamp blue grass, or false redtop.

Mr. RALPH. Martin Mathieson.

Mr. OSWALD. I was unable to determine No. 1 other than it is a grass.

Mr. RICHARDSON. And the name?

Mr. OSWALD. I did not know.

Mr. RALPH. No. 2, Thomas Watson, and No. 1, George Watson.

Mr. TAWNEY. Have you a sample here of Edward Ek's property?

Mr. RALPH. No.

Mr. TAWNEY. L. A. Ogaard?

Mr. RALPH. No.

Mr. TAWNEY. S. H. Clarke?

Mr. RALPH. No.

Mr. TAWNEY. Louis Oulson?

Mr. RALPH. Yes.

Mr. TAWNEY. John Ferguson?

Mr. RALPH. Yes.

Mr. TAWNEY. Clifford Demars?

Mr. RALPH. Yes.

Mr. TAWNEY. Bernt M. Weberg?

Mr. RALPH. Yes.

Mr. TAWNEY. Dora C. Mertine?

Mr. RALPH. No.

Mr. TAWNEY. Sadie Bancroft?

Mr. RALPH. No.

Mr. TAWNEY. W. S. Thomas?

Mr. RALPH. No.

Mr. TAWNEY. Gust Jackson?

Mr. RALPH. No.

Mr. TAWNEY. Mark Stadt?

Mr. RALPH. No.

Mr. TAWNEY. Mary Heronish?

Mr. RALPH. No.

Mr. TAWNEY. Kate Bennett?

Mr. RALPH. No.

Mr. TAWNEY. John Skogland?

Mr. RALPH. No.

Mr. TAWNEY. Herman Lumker.

Mr. RALPH. Yes.

Mr. TAWNEY. John A. Sangstrum?

Mr. RALPH. No.

Mr. TAWNEY. Nathan Philstrom?

Mr. RALPH. No.

Mr. TAWNEY. Fred Kelly?

Mr. RALPH. No.

Mr. TAWNEY. M. B. Hay?

Mr. RALPH. No.

Mr. RICHARDSON. That is all I have to ask the professor at this time.

Mr. TAWNEY. Have you any questions, Mr. Samuelson?



Mr. SAMUELSON. I do not know what question I could ask him on cross-examination. He said it is either grass or sedge. If he testified to something I might cross-examine him.

#### TESTIMONY OF PROF. R. W. THATCHER, OF MINNEAPOLIS, MINN.

Prof. R. W. THATCHER, after being duly sworn, testified as follows:

Mr. RICHARDSON. Will you please give your full name?

Prof. THATCHER. R. W. Thatcher.

Mr. RICHARDSON. You are connected with the State University of Minnesota?

Prof. THATCHER. Yes, sir; I am professor of agricultural chemistry in the University of Minnesota.

Mr. RICHARDSON. How long have you occupied that position?

Prof. THATCHER. Not quite three years.

Mr. RICHARDSON. Where were you before that?

Prof. THATCHER. I was for 12 years connected with the State College of Washington, first as chemist, later as director of the experiment station, and then as director of the department of agriculture of the State College of Washington.

Mr. RICHARDSON. Have you specialized in any way in connection with the food values of grasses?

Prof. THATCHER. I took an undergraduate course in chemistry at the University of Nebraska, from which I graduated in 1898. I took a postgraduate course in agricultural chemistry, receiving the master's degree in 1901. During the time in which I was serving as chemist for the Washington Experiment Station I was called upon several times to pass upon the feasibility of drainage and irrigation propositions and of damage to land by overflow in the States of Montana, Idaho, and Washington. During those investigations I made a considerable number of analyses of the various types of vegetation growing on such lands and had one or two feeding experiments conducted under my direction to show the comparative feeding values of natural vegetation upon swamp lands.

Mr. RICHARDSON. Were you present when the packages which are numbered from 1 to 24, except No. 4, were opened yesterday?

Prof. THATCHER. Yes, sir.

Mr. RICHARDSON. As the contents were taken out, did you examine them, and did you see the contents restored to the same receptacles?

Prof. THATCHER. Yes, sir.

Mr. RICHARDSON. You may state what you can, with respect to any division that should be made in the products in connection with food values.

Prof. THATCHER. Our experience with vegetation grown on swamp lands leads us to divide the vegetation into three types, from the standpoint of its food value to live stock.

In the first type we include cat-tails, rushes, and vegetation such as the wild flag—the lily family, we call it. That type we found to have absolutely no feeding value, for the reason that it contains a bitter principle which makes it unpalatable to animals, and they can not be forced to eat it, except on terms of starvation.

The second type, in which we include the coarser sedges and the rushes of the broad-leaf family, and which are commonly called the tules, we found by analysis and by feeding trials to have a certain amount of nutriment in them, but the amount of nutriment is so small that an animal of the small-stomach type, such as the horse or the hog, can not eat enough in 24 hours to get a sufficient amount of food to maintain life; but such foods, when fed to large-stomached animals like the cattle kind, do furnish a certain amount of nutrition. Our experience in feeding them was that if animals of that type were fed through an entire winter on that class of vegetation they came out in the spring weighing less or not more than they did in the fall. We therefore concluded that this second type has scarcely a maintenance value; that is, it will not do any more than maintain body weight, unless supplemented by some other food.

In the third type we secured the common wet-land grasses, including such as those that have been shown here. Those, by analyses and by practical feeding trials, are shown to have a feeding value sufficient to warrant their use for animals which are not at heavy work or which are not producing beef or milk or something of that kind in addition to maintaining their bodies. The quantity of food contained in that type, of course, varies a little with the different grasses and with the conditions under which they are grown, but in general they are found to have about the feeding value of ordinary straw. Calculated pound for pound, the actual amount of the different nutriment contained is about the same as in ordinary wet straw.

• I do not know whether you want me to go into greater detail as to how we make the analysis, and all that sort of thing, or not.

Mr. RICHARDSON. I will inquire of the commission.

Mr. TAWNEY. No; we do not.

Mr. RICHARDSON. This statement is based upon your knowledge and experience that you have acquired in the line of life that you have pursued?

Prof. THATCHER. It is based both on my own analyses of the results of the feeding trials and on comparisons that I have made in the literature of the results of our analyses in Washington and Montana as compared with those reported by the Wyoming experiment station and other individual analyses scattered through the literature in a great many places. That study of the literature convinced me that there is not a great variation in the composition of swamp land vegetation grown in different parts of the country. In fact, I found when I analyzed samples from southwest Washington and other samples from northern Idaho, and samples from middle Montana that they were practically identical in the same types of vegetation.

Mr. RICHARDSON. And you have looked at all the samples produced here and marked in these receptacles from 1 to 24, No. 4 being missing, have you?

Prof. THATCHER. Yes, sir.

Mr. RICHARDSON. You looked at them as they were examined by the witness, who immediately preceded you in giving his testimony?

Prof. THATCHER. Yes, sir.

Mr. RICHARDSON. The bluejoint grass that is included in these samples is in the third type, as I understand it?

Prof. THATCHER. Yes; the best of the swamp grasses.



Mr. RICHARDSON. It is the best of the swamp grasses?

Prof. THATCHER. That is, it belongs in the type of the best. I would have no way of knowing whether *Calamagrostis*, or blue-joint, or poa triflora, or false redtop is the better from the standpoint of feeding value.

Mr. TAWNEY. You made a comparison in your statement between a certain grass and wet straw. Does that include bluejoint grass?

Prof. THATCHER. Yes.

Mr. RICHARDSON. And also the false redtop?

Prof. THATCHER. Yes.

Mr. SAMUELSON. Have you ever had any experience with the blue-joint that is grown along the Rainy River district?

Prof. THATCHER. No, sir.

Mr. SAMUELSON. You have never examined it until this time?

Prof. THATCHER. No, sir.

Mr. SAMUELSON. You do not know anything of its food values?

Prof. THATCHER. I know of the food value of the species.

Mr. SAMUELSON. I mean of that individual kind.

Prof. THATCHER. No, sir.

Mr. SAMUELSON. And you are not prepared to say from such examination that you have made as to whether the sample that you have examined is even a fair sample of the kind of blue-joint that grows in this district?

Prof. THATCHER. No, sir; I only saw these samples yesterday.

Mr. SAMUELSON. That is all the experience you have ever had with it?

Prof. THATCHER. Yes, sir.

Mr. RICHARDSON. I offer in evidence the blue print which Mr. Ralph identified in connection with Algot Erickson's land as "Rainy River Improvement Company Exhibit A."

Mr. TAWNEY. Before you offer that I wish to say that I am informed by Mr. Meyer, the consulting engineer, that Mr. Berg's figures and Mr. Ralph's figures in regard to the land submerged are just one acre and four-tenths different up to the 498 level. It occurred to me to ask whether you wanted to put that in the record, in view of the fact that you have Mr. Berg's statement in.

Mr. RICHARDSON. I do not know whether the commissioners have examined this blue print or not.

Mr. TAWNEY. You had better put it in. Mr. Meyer says there is other information on the blue print that the consulting engineers would like to have.

Mr. RICHARDSON. I now offer in evidence these samples of grasses, the envelopes being numbered 1 to 24, inclusive, except No. 4, as "Rainy River Improvement Company's Exhibit B."

Mr. SAMUELSON. That pertains to the settlers, and it has been referred to with reference to the claims of the settlers. The settlers have no quarrel with the Rainy River Improvement Co., and such quarrel as they do have with reference to damages is against the Minnesota & Ontario Power Co. The corporation that is now being sprung in here as the forerunner of the exhibits is rather surplusage.

Mr. TAWNEY. We will receive them subject to your objection.

Mr. HILTON. As I have already informed the members of the committee, it will be necessary for me to leave to-night on the 6.40 train. I received a telegram yesterday from the attorney general of

the State of Minnesota inquiring when I would be back, and I advised him that I would leave to-night. He is to go away for a period of three weeks, and I feel that it is important that I should be back. I understand from the way the evidence has been going in that there is not much possibility of any testimony being put in relative to values of State lands, but, if any such evidence is to be received, I ask the committee's permission to have a certain objection, which I will now read, made to all such evidence:

The State of Minnesota objects to the introduction of any testimony that may be offered fixing or tending to fix the value of State lands described in Minnesota Exhibits A1 and B1 at a sum less than \$5 per acre as incompetent, irrelevant, and immaterial, for the reason that by the constitution and laws of the State of Minnesota the minimum price at which any of said lands may be appraised, sold, or otherwise disposed of is fixed at \$5 per acre, and said lands can not be taken from the State by sale, condemnation, or otherwise at a less sum than \$5 per acre.

The State of Minnesota asks that all evidence that may be offered and received along the lines just indicated shall be received subject to the objection aforesaid, and that at the close of all such testimony a motion may be entered in the record on behalf of said State that all such evidence be stricken out on the same grounds, as stated in the foregoing objection to the admission thereof. This is simply to preserve the rights of the State in any such testimony.

Mr. TAWNEY. That will be done. The testimony will be received, if offered, subject to your objection, and your motion to strike out will be entered at the conclusion of the testimony. It will stand on the record then as having been received subject to your objection and motion to strike out.

Mr. HILTON. Certain matters might come up which would have a tendency to affect the interests of the State, and as Mr. Samuelson is to remain here during the evening session, he has kindly consented to look after the interests of the State in the way of conducting any cross-examination that may appear to be necessary.

Mr. BERKMAN. Mr. Chairman, on account of the saving of taking witnesses to Winnipeg I would like to ask if the representatives of the power companies would agree to stipulate the price of the power delivered to the city for street lighting purposes and also the price at which they retail power to users of power in the city.

Mr. RICHARDSON. No such stipulation can be made at this time.

Mr. TAWNEY. In the absence of a stipulation or agreement, it would not be competent under the authority under which the committee is acting to take testimony, Mr. Berkman, outside of the question of damage done to the properties in the Rainy River district. You appreciate that, of course.

Mr. BERKMAN. Yes; I appreciate and understand that, and I thought possibly the power interests, in view of the fact that we do not have much money with which to handle the riparian interests, would be willing to stipulate at this time what those charges are. It would be a matter of accommodation more than anything else.

Mr. TAWNEY. In view of the fact that the representatives of the power interests decline—

Mr. BERKMAN. We can not urge it further.

Mr. TAWNEY. We would have no power to receive the testimony.

(Thereupon, at 5.35 o'clock p. m., the committee took a recess until 8 o'clock p. m.)



AFTER RECESS.

INTERNATIONAL FALLS, MINN.,

*Saturday, January 29, 1916.*

The committee reconvened at 8 o'clock p. m.

Mr. TAWNEY. Gentlemen, if you are ready now we will proceed.

## TESTIMONY OF MR. GEORGE A. RALPH.

GEORGE A. RALPH, after being duly sworn, testified as follows:

Mr. RICHARDSON. Mr. Ralph, you have lived in the State of Minnesota how long?

Mr. RALPH. Thirty-four years.

Mr. RICHARDSON. What counties have you lived in?

Mr. RALPH. I have lived in Red Lake, Pope, and Ramsey Counties.

Mr. RICHARDSON. To what extent have you become familiar with lands in the northern part of Minnesota?

Mr. RALPH. I was engaged in making Government surveys from 1888 to 1900. I have made extensive drainage surveys throughout northern Minnesota. I was employed by the State drainage commission as their chief engineer from 1900 to 1913, and during that time I made topographic surveys in northern Minnesota, covering nearly all the northern counties. I had charge of the water resources surveys for Minnesota throughout the State covering a period of four years. I had charge for the State of the topographic surveys which were carried out in cooperation with the Federal Government, besides making special drainage surveys.

Mr. RICHARDSON. Your topographic surveys and maps for the State drainage commission were made in what years?

Mr. RALPH. In the years 1905 and 1906, and the water resources surveys were made in the years 1905, 1910, 1911, and 1912.

Mr. RICHARDSON. Your topographic surveys were printed in the form of maps, were they not, by the State?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. Comprising a large volume?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. They covered all of what is now this county, did they not?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. And all of what is known as Itasca County?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. And some portion of St. Louis County?

Mr. RALPH. All of St. Louis County.

Mr. RICHARDSON. Did they not cover all the territory between here and the State of North Dakota?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. Each county of the northern tier of counties through the boundary between Minnesota and Dakota?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. In your experience have you become thoroughly familiar with land values in northern Minnesota as they have existed for the last 15 years or more and as they still exist?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. Have you dealt some in lands yourself?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. Are you now a land owner?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. In how much land, in a general way, are you interested?

Mr. RALPH. About 13,000 acres.

Mr. RICHARDSON. In what counties is that situated?

Mr. RALPH. In the counties of Itasca, Aitkin, Roseau, and Morrison. I do not recall having land in any other counties.

Mr. RICHARDSON. Will you compare briefly the lands of Aitkin County and the lands of Itasca County with the lands in Koochiching County, so far as the northern part of Koochiching County is concerned?

Mr. RALPH. The uplands of Aitkin County are quite similar to the uplands of Koochiching County, and the swamp lands of Aitkin and Itasca Counties are similar in many respects to the swamp lands of Koochiching County.

Mr. TAWNEY. Just state, Mr. Ralph, whether Aitkin County is a northern county.

Mr. RALPH. It is a northern county. Itasca County is also a northern county.

Mr. RICHARDSON. Are both timbered counties?

Mr. RALPH. Both are timbered counties.

Mr. RICHARDSON. Are both very wet counties?

Mr. RALPH. Both are very wet counties. There is a portion of the uplands in Itasca County, in the eastern part of the county, that is unlike any of the uplands in either Aitkin or Itasca Counties, for the reason that there is much exposed rock ledge in the eastern portion of Koochiching County.

Mr. RICHARDSON. You have been engaged in making surveys in Koochiching County and in St. Louis County for the Rainy River Improvement Co. about how long?

Mr. RALPH. About a year or a little more.

Mr. RICHARDSON. During that time you have devoted a great part of your time to that work, have you not?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. You have had prepared a large number of blue prints, have you not, showing the results of your work in these counties with reference to contour lines, acreage, location of water bodies, location of upland, and location of swamp?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. Also, covering the location of buildings and the location of cultivated gardens?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. Do you know of any piece of agricultural land between Ranier and the line drawn north and south through the eastern terminus of Lake Namekan, upon which there has been any cultivation of the soil done outside of a few garden plots?

Mr. SAMUELSON. That is objected to as being incompetent, irrelevant, and immaterial. The witness has not shown himself qualified to answer, and the question is too broad to be of any aid to the commission.



Mr. TAWNEY. Subject to the objection, the question may be answered.

Mr. RALPH. If you were to go a mile and a half east of Ranier or a mile and a half east of the range lying between ranges 23 and 24 and include the territory you have described, I know of no land that is being cultivated to any extent, nor of any land that I consider suitable for agricultural purposes.

Mr. RICHARDSON. How thoroughly have you been over that territory?

Mr. RALPH. I have been over it very thoroughly.

Mr. RICHARDSON. Have you become familiar with practically all the governmental subdivisions in that territory?

Mr. RALPH. Yes.

Mr. RICHARDSON. Are you familiar with the lands which are shown on the tables marked "Minnesota Exhibits D and E," and which appear to have been colored green?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. With respect to the State lands shown on Minnesota Exhibit D and colored green, can you classify those lands in any way as to values?

Mr. RALPH. Yes, sir; I think I can.

Mr. RICHARDSON. Into what subdivisions would you put them in valuing them?

Mr. RALPH. You refer to the State lands?

Mr. RICHARDSON. Yes.

Mr. TAWNEY. Mr. Richardson, so far as the State lands are concerned, it is understood that this evidence is taken subject to the objection made by the assistant attorney general of the State of Minnesota?

Mr. RICHARDSON. Yes.

Mr. RALPH. The State lands that are shown on this exhibit are among the very poorest of the State lands. They are lands that lie along the water front and are mostly low and have little timber of value. The land has little value outside of what timber there is growing on it. The land on the eastern end of Rat Root Lake is very low and much of it is in reality a part of the lake, and much of the State lands along Rat Root River consist of the lowest and poorest lands in Koochiching County.

Mr. RICHARDSON. What, in your opinion, is the fair value of such of the State lands marked on that exhibit which lie below the elevation of bench mark 496?

Mr. SAMUELSON. That question is objected to on the ground that it is incompetent, irrelevant, and immaterial. It makes no difference what value this witness may place upon that land, because of the fact that the constitution and statute of the State fix the minimum price at which these lands may be sold.

Mr. MIGNAULT. As Mr. Tawney just stated, the whole evidence is taken subject to the objection made by the assistant attorney general of the State of Minnesota.

Mr. SAMUELSON. Very well, if that may be understood.

Mr. MIGNAULT. That is understood.

Mr. RALPH. The State lands lying along the Rat Root River, which are shown here in dark green and lying below elevation 496,

have no value at the present time, nor can they ever have much if any value.

Mr. TAWNEY. You say at the present time?

Mr. RALPH. At the present time or at any time.

Mr. TAWNEY. Do you take into consideration now the condition that these lands are overflowed at the present time? That is what I want to ascertain.

Mr. RALPH. I do not believe that those lands lying below elevation 496, even though the things were all in their natural order and there was no control of the waters of Rainy Lake and Rainy River, will ever be of much, if any, value.

Mr. MIGNAULT. If the water of Rainy Lake were maintained at the level of the meander lines, for instance, would those lands be more valuable?

Mr. RALPH. It would be impossible to maintain waters of Rainy Lake at meander lines. The elevations of the meander lines vary all the way from 489 to 496 or 497.

Mr. MIGNAULT. Well, if there were no control or no dam at the outlet of Rainy Lake, and if Rainy Lake were in a state of nature, would it make any difference as to the value of these lands?

Mr. RALPH. It would not make much difference. If you had a dry cycle of 9 or 10 years, the lands might be above water for a few years and might have a value for a few years, but I believe, taking it in the long series of years, 25 or 30 years, that lands lying below 498 in the natural order of things will be flooded fully half of the time; that is, fully half of the number of years, to a sufficient extent to destroy farm crops.

Mr. RICHARDSON. With regard to the State lands shown on Minnesota Exhibit D, which lie above the elevation 496, will you state what the value is?

Mr. RALPH. The value does not exceed \$5 per acre. There is a large quantity of State land offered for sale in this county at a less price than \$5 an acre, and it has found no bidders.

Mr. RICHARDSON. On tracts where there is no timber at elevation about 496, what would you say as to the value? I am referring to those shown on Minnesota Exhibit D.

Mr. RALPH. Above elevation 496?

Mr. RICHARDSON. Yes; but having no timber.

Mr. RALPH. I would not place it at more than \$5 an acre.

Mr. TAWNEY. As I understand you, then, Mr. Ralph, it is your judgment that none of the State lands above contour 496 is worth more than \$5 an acre as shown on Minnesota Exhibit D?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. With reference to such portion of the lands which lie between 496 bench-mark contour line and 497 bench-mark contour line, what is the value?

Mr. RALPH. If you would undertake to sell it in that way I doubt very much if you sell it at all, but if you could get a 40-acre tract lying between 496 and 497 the value would be the same as I have already testified, not to exceed \$5 per acre.

Mr. RICHARDSON. Between contours 497 and 498?

Mr. RALPH. It would be the same.

Mr. RICHARDSON. Between contours 498 to 500?



Mr. RALPH. There would not be much difference. Land lying along at the level of 496 to 500, or four 4 above water surface, has not much difference in value unless there are some peculiar features.

Mr. RICHARDSON. You may state what you know as to the accessibility of these State lands.

Mr. RALPH. The lands on the easterly end of Black Bay are inaccessible except by water. The lands along the lower reaches of the Rat Root River are inaccessible except by water, and the greater portion of the lands shown on this exhibit farther up the Rat Root River are inaccessible except by water. There are no roads that can be traveled in the summer time that reach these lands.

Mr. RICHARDSON. You may state what you know about the settlements in and around those lands in that locality.

Mr. RALPH. There is at the present time, I think, just one settler on the south side of Rat Root River between Mrs. Berton's place, in section 9, township 69, range 23, and the easterly end of Rat Root Lake. The eastern end of Rat Root Lake is in section 13, township 70, range 23.

Mr. TAWNEY. What is the distance?

Mr. RALPH. The distance by water would be 16 miles. There is a fisherman living in section 17, township 70, range 22. There is a settler living in section 26, township 70, range 23. There is an old log house in section 26. There is a fellow camping there, but I think he is temporary. It did not look as if he had been there long. On the other side of the river there are no settlers until you get down to Mr. Lomker's place, in sections 4 and 5, and he is a very poor excuse for a settler.

Mr. SAMUELSON. I move that that portion of the witness's testimony be stricken out as not being responsive to the question that has been asked.

Mr. RALPH. I was going to state that his land is very rocky, and that he has less than a quarter of an acre under cultivation, and that the land, in my opinion, would not support anybody.

Mr. SAMUELSON. Will you kindly confine yourself to the question that has been asked, so I may interpose the proper objection at the proper time? I object to the descriptive matter interposed by the witness with reference to Lomker's land on the ground that it was not included in the question asked. I ask that that be stricken out as not being responsive.

Mr. TAWNEY. The answer will be received subject to your objection, Mr. Samuelson, and reported to the full commission.

Mr. MIGNAULT. Of course you will understand, Mr. Samuelson, that Mr. Richardson can put a question covering that, and it would meet your objection. If the witness has gone beyond the question I can understand the reason why you object.

Mr. SAMUELSON. Yes; he has gone beyond it, and that is the reason I object.

Mr. MIGNAULT. But Mr. Richardson can cover it by a subsequent question, and the point would be a little too technical, probably, for us to interfere.

Mr. RICHARDSON. In the territory covered by Minnesota Exhibit D what schoolhouses are there?

Mr. RALPH. There are no schoolhouses until you get to Ericksburg, in section 6, township 69, range 23.

Mr. TAWNEY. What is the size of that village?

Mr. RALPH. It is a village of about 50 population, I would judge.

Mr. MIGNAULT. How far is it from Ranier?

Mr. RALPH. About 9 miles.

Mr. MIGNAULT. It has a post office?

Mr. RALPH. It has a post office and two stores and two boarding places or hotels, also two or three residences.

Mr. MIGNAULT. It has a school?

Mr. RALPH. Yes, sir; I think it has a school. I think I saw a school there.

Mr. RICHARDSON. Do you know anything about the drainage that has been undertaken in any public form in that territory east of Ericksburg?

Mr. RALPH. There has been some drainage undertaken immediately east of Ericksburg on the north side of the rapids.

Mr. RICHARDSON. About when was that undertaken, if you know?

Mr. RALPH. I do not know.

Mr. RICHARDSON. Do you know the nature of the undertaking—whether it was a State, county, or judicial district?

Mr. RALPH. It was either judicial or county. The State did not put any ditches in.

Mr. RICHARDSON. In regard to the vegetation which is on the lands shown on Minnesota Exhibit D as belonging to the State, being colored green, at about what elevation do you find the line of demarcation between upland and lowland?

Mr. RALPH. Do you mean between upland vegetation and the water grasses, water vegetation?

Mr. RICHARDSON. Yes.

Mr. RALPH. It is between elevations 496 and 497.

Mr. RICHARDSON. What is the character of the water vegetation?

Mr. RALPH. It consists of rushes, sedges, cat-tails, lilies, and coarse grasses.

Mr. MIGNAULT. Will you state for my information, Mr. Ralph, what is water vegetation as distinguished from land vegetation?

Mr. RALPH. Water vegetation is the vegetation that I have described, consisting in this locality of rushes, sedge grasses, coarse grasses, such as certain kinds of blue-joint and wire grass. Upland vegetation consists of red-top, which would be valuable for fodder, the sandy and more nutritious kinds of blue grasses, timothy, and clover.

Mr. MIGNAULT. Does the vegetation that you call water vegetation grow in water?

Mr. RALPH. Yes, sir.

Mr. TAWNEY. Does that include willows, also?

Mr. RALPH. Yes, sir.

Mr. TAWNEY. And certain kinds of trees and wood?

Mr. RALPH. Yes, sir; it includes tamarack, spruce, cedar, willow, and Balm of Gilead. They grow slowly.

Mr. TAWNEY. They grow in water, though?

Mr. RALPH. They grow in water. Certain poplar will live for a long time in water. So will ash. They grow very slowly.

Mr. TAWNEY. Deciduous growths of almost all kinds?



Mr. RALPH. Deciduous growths of almost all kinds; yes, sir; and ash and cedar and elm.

Mr. TAWNEY. I asked that question because in the classification of growth of different kinds the consulting engineers have indicated on their maps certain trees. I was wondering if you corroborated their classification of growth with respect to grasslands. You have seen the cultivation of growth on lands along this lake and also the Lake of the Woods, as shown on the maps of the consulting engineers?

Mr. RALPH. I have not looked into it very much. I probably noticed it, but I have not studied it any.

Mr. MIGNAULT. But you know the class of vegetation, both on the Lake of the Woods and on Rainy Lake?

Mr. RALPH. Yes, sir.

Mr. MIGNAULT. It is substantially the same class, is it?

Mr. RALPH. Yes, sir; substantially.

Mr. MIGNAULT. That is, in this low-lying land, what you call lowlands?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. In your observation, Mr. Ralph, in connection with the State lands shown on Minnesota Exhibit D and marked green, did you observe any muskeg?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. What do you mean by muskegs?

Mr. RALPH. Perhaps I had better modify that statement a little bit. If you mean the lands that are colored green on Minnesota Exhibit D, there is some muskeg, but it is on the easterly end of Rat Root Lake where I noticed the muskeg particularly.

Mr. RICHARDSON. Is there muskeg in the vicinity of the State lands?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. What do you mean by muskeg?

Mr. RALPH. I mean swamp lands or swampy land, where the peat or soil of the surface is floating, and such land that when you walk over it it will act as a blanket on the water.

Mr. RICHARDSON. It will undulate?

Mr. RALPH. It will undulate; yes, sir.

Mr. TAWNEY. Do you include floating bog in you description of muskeg?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. What is the effect on lands in the vicinity of such bog or muskeg of the presence of muskeg?

Mr. RALPH. As to their value?

Mr. RICHARDSON. Well, as to conditions of moisture.

Mr. RALPH. They are usually wet.

Mr. TAWNEY. Mr. Ralph, pardon me just a moment. Is there muskeg with timber and muskeg without timber?

Mr. RALPH. I do not know of any muskegs that I would class as muskeg that contained timber. It might contain a few small stunted tamarack or spruce, but no timber of any value or size.

Mr. MIGNAULT. Stunted timber, not merchantable?

Mr. RALPH. Not merchantable timber. When I speak of muskeg I refer to these large areas of practically open swamp land which may have scattering small spruce or tamarack trees, and land that

is so wet and whose surface is in such condition that it will undulate when you walk over it; what is commonly called a floating bog.

Mr. TAWNEY. How deep would the peat formation be in order to constitute a muskeg?

Mr. RALPH. It would have to be from 3 to 4 feet and upwards.

Mr. RICHARDSON. In the State lands shown upon State Exhibit D and colored green, you may state whether or not there was any grass or stumpage of commercial value.

Mr. RALPH. There was none whatever.

Mr. RICHARDSON. Looking at Minnesota Exhibit E and the lands there indicated and similarly colored, those lands extend between what lines?

Mr. RALPH. Do you mean township or section lines?

Mr. RICHARDSON. Yes.

Mr. RALPH. They extend from range lines 22 and 23 to the eastern boundary line of section 4 in township 68, range 20, and on a line due north from that point.

Mr. RICHARDSON. What, in your opinion, is the fair value of that portion of those lands which lies below the bench-mark elevation 496?

Mr. RALPH. There is only a very small portion of those lands, if any, that lies below elevation 496. They are on the Kabetogoma waters or above the Kabetogoma waters.

Mr. RICHARDSON. What portion of them is below the bench-mark contour elevation line of 500, if you are able to state?

Mr. RALPH. Along the State at that time a very small portion, if any. I doubt if there is any below elevation 500.

Mr. RICHARDSON. On the other map you took as a dividing line bench-mark elevation 496?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. On these lands shown on the map marked Minnesota State Exhibit E, what dividing line do you take?

Mr. RALPH. I take elevation 500 to 510; that is, I am considering lands on Lake Kabetogoma, whose waters at present have an elevation of about 498.6 and have been as high as 508 and higher. They have been as high as 508 in recent years.

Mr. SAMUELSON. Since the work was commenced on the dam up there?

Mr. RICHARDSON. Mr. Samuelson, please let me finish. Mr. Ralph, between the contour lines 505 and 508 what valuation would you place?

Mr. RALPH. They have absolutely no value. They are below what I regard as the essential high-water mark on Lake Kabetogoma, and they are liable to be flooded at any time and are under water much of the time.

Mr. RICHARDSON. With reference to those between 508 and 510 contour lines, what are their values?

Mr. SAMUELSON. That question is objected to on the ground that the witness has not shown as to what time the question asked has reference. It is a well-known fact that conditions are not in their natural state at the present time, and the question does not indicate whether it is in the original state of nature or whether it is under changed conditions.

Mr. TAWNEY. The witness may answer the question subject to the objection.



Mr. RALPH. Not more than \$5 an acre, and they could not be sold at this time for anything. I can not conceive of those lands having a value of more than \$5 an acre.

Mr. RICHARDSON. Do you mean at any time in the future?

Mr. RALPH. I would not say at any time in the future, but under present conditions, under the present means of transportation and the means of getting in and out, and the undeveloped condition of the country.

Mr. RICHARDSON. What are the values between contour lines 510 and 515?

Mr. RALPH. Not to exceed \$5 an acre. I would not pay that, and I do not think anybody else I know of would pay it who is buying land; but, of course, the value would not exceed \$5 an acre.

Mr. RICHARDSON. You may state about the roads in that district in which the State lands are included on Minnesota Exhibit E.

Mr. RALPH. There are no roads. The greater portion of the lands marked in heavy blue on Exhibit E consist of large muskeg.

Mr. RICHARDSON. In about what proportion?

Mr. RALPH. About 60 to 70 per cent.

Mr. RICHARDSON. In the district between the westerly line and the easterly line of the State lands shown on Exhibit E, what school-houses are there?

Mr. RALPH. There is a schoolhouse near Mr. Gappis' place. He is in section 28, township 69, range 21.

Mr. RICHARDSON. Is there any other schoolhouse in the whole territory?

Mr. RALPH. No, sir; not until you get out toward Ray.

Mr. RICHARDSON. Where is Ray?

Mr. RALPH. Ray is about 11 miles west of Mr. Gappis' place.

Mr. RICHARDSON. With reference to the western boundary of the State line shown on Minnesota Exhibit E, where is Ray?

Mr. RALPH. Ray is in section 6, township 68, range 22.

Mr. RICHARDSON. In the southwesterly corner of the map?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. If the waters in the territory shown on Minnesota Exhibit D, or on Minnesota Exhibit E, were absolutely free from artificial control, would that make any difference in the values you have given?

Mr. RALPH. No, sir; it would not make any difference, because I have knowledge that the waters have been up to and above elevation 496 frequently in the natural order of things on Rainy Lake, and they have been up to and above elevation 508 on Lake Kabetogoma. What is known as Gold Portage, extending from Rat Root Lake to Kabetogoma, crosses a divide having an elevation of 509.6, and portages have been made in water all the way from Lake Kabetogoma to Rat Root Lake. The water would have to be at elevation 510 or above to go through there.

Mr. RICHARDSON. If the waters of Rainy Lake and Rainy River were also free from artificial control, you may state whether that would make any difference in the value of any of these lands?

Mr. RALPH. Any difference from what I have testified to?

Mr. RICHARDSON. Yes.

Mr. RALPH. No, sir.

Mr. RICHARDSON. With regard to the lands of private parties or individuals along Rat Root River, in a general way, are the conditions any different from those which you have given us with respect to the State lands?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. In what way?

Mr. RALPH. The lands are higher and better than the State lands. That is, some of the settlers' land is higher and of a better quality than the State lands.

Mr. TAWNEY. I suppose that is natural, is it not? People who desire to settle would pick out the best of the State lands?

Mr. RALPH. Yes; these people have the best lands that are in there.

Mr. RICHARDSON. I will show you a sheet marked Settlers' Exhibit A, and ask you to look at the names recorded under the heading "private owners," from the top to the bottom of the sheet, and state whether you are familiar with the various parcels set down opposite those owners' names, or those indicated to be owners.

Mr. RALPH. I am familiar with nearly all of the lands mentioned in this list; there are a few descriptions, however, that I am not familiar with.

Mr. RICHARDSON. Which ones are those, by names of the parties?

Mr. RALPH. Dora C. Mertin; I can not just place her land now. Mary Heronish; I can not place her land; and John A. Sangstrum. I think that is all I do not know.

Mr. RICHARDSON. The rest you know?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. With reference to those lands, are some of them in what may be termed the Kabetogama Lake district, to which you have referred?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. With regard to the lands there included which are in the Kabetogama Lake district, you may state their fair value below the contour line of bench mark 508.

Mr. SAMUELSON. That is objected to, on the ground that it is indefinite, no proper foundation has been laid, and no time fixed.

Mr. TAWNEY. You may answer the question subject to the objection.

Mr. RALPH. Lands lying below contour 508 have no value.

Mr. TAWNEY. That is below contour 508 in the Kabetogama district?

Mr. RALPH. Yes.

Mr. SAMUELSON. May I ask one question at this time?

Mr. TAWNEY. I think you may, Mr. Samuelson.

Mr. SAMUELSON. What land is there on that list that is in the Kabetogama district?

Mr. RALPH. There is more—I do not find any now. We have Mr. Pard and Lattus—they are not in that list.

Mr. SAMUELSON. Then there is none on that list?

Mr. RALPH. No.

Mr. RICHARDSON. With reference to that exhibit, you may state what is the value of the lands described there below the contour line, bench mark 496.

Mr. SAMUELSON. That is objected to, on the ground that it is incompetent, irrelevant, and immaterial, no time is fixed upon which



to base the testimony, and it has already been shown here that the land up to 496 is now overflowed and, of course, it would be of no value, and that is not the basis upon which the commission would act.

Mr. TAWNEY. You may answer subject to the objection.

Mr. RALPH. Land lying below elevation 496 has no value.

Mr. RICHARDSON. Are all the lands noted on that exhibit in the Rainy Lake or Rainy River district?

Mr. RALPH. Yes; I believe they are. There are some lots here and town sites.

Mr. TAWNEY. Do you include the Rat Root River or Rat Root Lake district?

Mr. RALPH. In the Rainy River district.

Mr. RICHARDSON. You may state the fair value of that portion of the lands between contour line 496 bench mark and 498.

Mr. SAMUELSON. That is objected to, on the ground that it is incompetent, irrelevant, and immaterial. The witness has not shown himself qualified to answer it, and the scope of the question is too broad to give a fair and intelligent answer. Included within that limit is village lots in the village of Ranier. Take property in the village of Ranier and various other districts; the testimony already shows that the water is at the contour line now of 497, and possibly a little more; and, of course, the land would be of no value if the question is directed to the present condition, and not to the condition as it was in the original state of nature.

Mr. RICHARDSON. I am speaking of the value of agricultural lands.

Mr. MIGNAULT. It is understood that objections are reserved for the whole commission.

Mr. TAWNEY. The question may be answered with reference to agricultural land, subject to the objection.

Mr. RICHARDSON. I will change that slightly. I am speaking of lands for agricultural purposes.

Mr. SAMUELSON. And that is objected to, for the reason that the testimony has already shown that these lands are for other purposes besides agricultural purposes, and I take it that the individuals have the right to use the land for the most advantageous purposes to which it can be put, rather than to use it merely for agricultural purposes.

Mr. TAWNEY. You may answer the question, subject to the objection.

Mr. RALPH. Covering the whole of the lots, the value would vary some, and the value would probably range from \$5 to \$8 or \$10 an acre for that strip, depending on the land it is adjoining.

Mr. TAWNEY. Could you, with the information furnished you there by that exhibit, go through and give your best judgment as to the fair value of the land in each strip described, giving the name of each owner?

Mr. RALPH. The fair value of each tract as a whole?

Mr. TAWNEY. I mean within the contours of the—

Mr. RICHARDSON. I may say to the gentlemen of the committee that I was doing it this way to shorten matters, and I would be very glad, if the commissioners think that we have the time, to go into the matters more in detail, to submit detailed copies of various locations included in this list.

Mr. TAWNEY. Personally, I think we would have the time, and inasmuch as he said he could not give his testimony in a general way,

because the value varied according to certain districts, I think perhaps it would be the easiest and quickest way to get at it to allow him to go through each one, if can do so.

Mr. RALPH. Yes, sir; I think I can. I am quite familiar with all the districts, except those that I have mentioned. The first description is that of Alice M. Clarke, and that portion of her land lying between contour 496 and 498 would not have a value of more than \$5 an acre. The same is true of the next description, which is Daisy M. Clarke, and the next description is that of Algot Erickson. That land lying between contour 496 and 498 would have a value of \$8 to \$10 an acre—\$8 an acre would probably be as high as I would put it. The next description is that of Edward Ek. There is very little of that land that lies between contour 496 and 498; his low land is down about 494 and 493, and the balance of the land is rocky, poor land, so that there is little of it lying between contour 496 and 498, and what there is would not have a value greater than \$5 an acre. The next is the Coxon land, and this would have a value from \$8 to \$10 per acre. The Clarke land would be the same; the L. A. Ogaard land—there are conditions entering in there that I would not undertake to estimate the value now. The Carl Erickson land would have a value of about \$8 an acre. Those Oulson lots would have a value not exceeding \$5 an acre.

Mr. TAWNEY. You are giving this all between those elevations?

Mr. RALPH. Yes; Ferguson land the same, and the Demers land the same; they are all lying contiguous, and the Weberg land the same; the Sadie Bancroft land is similar to the land of Mr. Ek, and the land lying between those contours would not have a value of more than \$5 an acre. The same is true of Bert T. Pease's land, and W. S. Thomas's land, and the Markstadt land; and the same is true of Kate Bennett's land, and Herman Lunker's land, and R. H. Bennett, and also of the Rhoda A. Sproul land. The Gilbert Carlson land has no value at all. His land is either rocks or meggies, and it has no value. The Frederick Heineman land would have a value of about \$8 an acre, some land up near Ericksburg, and the John Skogland land the same, and the same is true of George Watson's and Thomas Watson's land; and Martin Mathieson—I do not think he has any land higher than 496; I think it is all below 496—so I will not give an estimate of that now. Hattie Barton—her land would have a value of not more than \$6 an acre, and the same is true of the Galt land and the Sproul land and the Edward Ek land. The Kelly land, the lake lot there, is unfit for agricultural purposes; it is all right for building a lake cottage on. The shore is quite abrupt, and there would be very little land between 496 and 498, possibly not more than half an acre, and it would be hard to place a value on it. That covers the list.

Mr. RICHARDSON. With regard to the lands shown there, aside from those which are in platted lots, where the elevation is above 498, say, from 498 to 500 bench mark, contour line, what would be the value? How would it vary from the values between 496 and 498?

Mr. RALPH. It would vary about in the same proportion. Of course, the land near Ericksburg—there is a few farms there that are pretty fair farms, and when you get above 498, from 498 to 500, they are fair meadow lands and would be worth \$10 to \$15 an acre.



Mr. RICHARDSON. In using the word "farm," you do not mean that in the sense of cultivated land?

Mr. RALPH. No; I mean in the sense that they talk about them in this case. There are no farms there, really.

Mr. RICHARDSON. If there were no control of the waters of Rainy River or Rainy Lake, what valuation would you put on the same parcels about which you have testified?

Mr. RALPH. It would be about the same. I have testified with reference to elevation 496, and I do not consider lands on Rainy Lake waters, in the natural order of things, below elevation 496 of any value for agricultural purposes.

Mr. RICHARDSON. And your testimony, so far as you have given it, in giving the values that you have with reference to the lots included in this Settlers' Exhibit A, related to that portion of the land above the contour line bench mark 496?

Mr. RALPH. Yes.

Mr. RICHARDSON. Have you here at the courthouse the receptacles into which you placed the vegetable matter that you collected, aside from the sedges, grasses, etc., which have been produced here?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. And that you said you kept in sealed jars?

Mr. RALPH. Yes, sir.

Mr. RICHARDSON. Have they ever been opened since you took them?

Mr. RALPH. No.

Mr. RICHARDSON. And they were taken when?

Mr. RALPH. From the 5th to the 10th of November, 1915.

Mr. RICHARDSON. Will you produce them?

Mr. RALPH. Yes, sir; these are the jars.

Mr. RICHARDSON. You have them before you?

Mr. RALPH. Yes.

Mr. RICHARDSON. Are they so marked that you know where they come from?

Mr. RALPH. Yes; that exhibit 1 was taken from——

Mr. RICHARDSON. In speaking of these exhibits, may we call them the Rainy River Improvement Co. C1, 2, 3, 4, etc.? B was the hay exhibit. From what parcel did that come [Rainy River Exhibit C1]?

Mr. RALPH. It came from the land of George Watson.

Mr. RICHARDSON. And from what part of the Watson land?

Mr. RALPH. From the land lying about elevation 496 on lot 1, I think it is section 5, of township 69, range 23.

Mr. MIGNAULT. What does this contain?

Mr. RALPH. It contains the muck that was taken at the place where we collected samples of vegetation.

Mr. MIGNAULT. One of these jars corresponds with the corresponding sample of vegetation?

Mr. RALPH. Yes.

Mr. RICHARDSON. Being the samples which were identified as B1 to B24, etc., No. 4 being missing?

Mr. RALPH. Yes.

Mr. RICHARDSON. In going about Rainy Lake, did you observe any sandy beaches?

Mr. RALPH. Yes; there were some sandy beaches immediately above Ranier. Sandy beaches are scarce around the south shore of Rainy Lake. It is either rock or swamp.

Mr. RICHARDSON. Can you locate for us this sandy beach above Ranier?

Mr. RALPH. There is a sandy beach at the dock and a bar that extends out into the lake for some distance—that is the dock used by the Canadian Northern Railway. There is also a sandy beach on Ogaard's land.

Mr. TAWNEY. Do you know where the summer hotel is up here, 15 or 20 miles off the south—

Mr. RALPH. Yes; that is Pease's Hotel.

Mr. TAWNEY. Quite a large hotel?

Mr. RALPH. Yes.

Mr. TAWNEY. There is a sandy beach there, is there not?

Mr. RALPH. There is an elevation of about 498. There is some sand there, but, as a rule, the shore line of Rainy Lake, on the south side, is either rock or swamp, and sandy beaches are rare.

Mr. RICHARDSON. I am going over these lands, particularly the lands referred to in Settlers' Exhibit A. State whether or not you observed any marks upon the trees or elsewhere with regard to high water?

Mr. RALPH. I did.

Mr. RICHARDSON. Taking the Algot Erickson land referred to in the Rainy River Improvement Co.'s Exhibit A, where did you see any trees on that land, upon which there were visible high-water marks?

Mr. RALPH. I saw traces near the southwest corner of lot 6 in section 27; they were not on lot 6, they were on Carl Erickson's land in section 34; but they were near the corner of that lot; and there was a high-water mark on those trees at elevation 497.6 or 497.8; between 497.6 and 497.8 I saw trees over near the southwest corner of the southeast quarter of the southwest quarter of section 27 on Mr. Erickson's land.

Mr. RICHARDSON. Algot Erickson?

Mr. RALPH. Yes; and there was a mark on those trees at the same elevation. I saw trees along the west side of Mr. Erickson's land—small trees.

Mr. TAWNEY. Can you give the date you saw those marks?

Mr. RALPH. Yes; it was February—about the 9th and 10th, 1915.

Mr. TAWNEY. Between what dates?

Mr. RALPH. It was 9th and 10th February, 1915. I do not recall any other places just now, but probably there were other places. Those marks were about a foot, or from a few inches to a foot, above the surface of the ground.

Mr. TAWNEY. I believe you stated that you had made quite a large number of diagrams of the various parcels.

Mr. RALPH. Yes.

Mr. SAMUELSON. At the time you saw the water upon these trees at Carl Erickson's place and Algot Erickson's place, and you found those water marks at 497.6, what was the height of the water at the dam of the Minnesota & Ontario Power Co. at International Falls?

Mr. RICHARDSON. Objected to as assuming something that has not been shown, and the Minnesota & Ontario Power Co. has no dam at



International Falls, and the question is misleading, and the witness would not be able to answer it.

Mr. TAWNEY. For the purposes of the investigation it is not material as to who owns the dam. The question is to get the height of the water at the dam and this land. The evidence will be received subject to the objection.

Mr. RICHARDSON. I would ask, on account of the litigation now going on, and in which counsel has tried to frame such questions with this in view, that this question be reframed.

Mr. TAWNEY. It is not material for this investigation, and the question of the ownership of the dam has no relevancy as to our investigation. That is the reason I made the statement.

Mr. RICHARDSON. I am speaking from a practical position, and I know if I permit the witness to answer the question, regardless of what the committee may have said in the record about it, we will become involved in court in a controversy in a jury case, and in numerous jury cases, in which it will be entirely unnecessary to have involved us, if the question is required to be reframed.

Mr. TAWNEY. I do not see how we can avoid receiving the answer to the question, subject to the objection.

Mr. MIGNAULT. We have done so, regardless of what may be the motive; in fact, we have nothing to do with the motive. I think the question is relevant, in view of the line of questions which have been put to Mr. Ralph. My view would be that the question is a relevant and competent one, but you will have the benefit of your objection, which will be considered by the commission, and I take it that the committee has no power to exclude evidence, but should act as it has acted from the beginning and reserve any objection for the consideration of the whole commission.

Mr. RICHARDSON. I fear I have not made myself understood. I have no objection to a question of that character. I simply object to putting into the question the ownership of the Minnesota & Ontario Power Co. of the dam, and the witness will be obliged to give an answer to the question which will be of a negative character and of no value to the commission, whereas if the question were framed so as to eliminate the Minnesota & Ontario Power Co. by simply designating a dam——

Mr. TAWNEY. What you object to is the assumption in the question as to the ownership of the dam?

Mr. RICHARDSON. Yes; that is all.

Mr. MIGNAULT. I think we can instruct the witness to answer the question without reference to the ownership by any corporation or person of the dam referred to in the question by Mr. Samuelson, if that meets the objection.

Mr. TAWNEY. If you can answer the question, answer it without reference to the ownership of the dam, because that is an assumption.

Mr. RALPH. I do not know what the elevation of the water was at the dam; I know it had an elevation of 493.1 at Ranier.

Mr. SAMUELSON. At Ranier?

Mr. RALPH. Yes.

Mr. SAMUELSON. You do know, do you not, that the water at the dam has been as high as 497?

Mr. RALPH. Yes, sir.

Mr. SAMUELSON. And you do know that when the water is at 497 at the dam, then the water would be at 498, and more, at Algot Erickson's place?

Mr. RALPH. I do not know that.

Mr. SAMUELSON. You do not know that?

Mr. RALPH. No.

Mr. SAMUELSON. Do you know that the water two miles or more above the dam is higher than it is at the dam?

Mr. RALPH. I know there is a difference between the stage of water at Ranier or Rainy Lake, a large difference between Ranier and the dam.

Mr. SAMUELSON. And that is that the water at Ranier is higher than the water at the dam?

Mr. RALPH. Yes.

Mr. SAMUELSON. And do you know what that difference is ordinarily?

Mr. RALPH. It varies.

Mr. SAMUELSON. Between what points?

Mr. RALPH. It varies from one to two tenths of a foot to six-tenths, usually.

Mr. SAMUELSON. About six-tenths between Ranier——

Mr. RALPH. From one or two tenths to six-tenths is the usual variation.

Mr. SAMUELSON. Between the dam at International Falls and the gauge at Ranier?

Mr. RALPH. Yes.

Mr. SAMUELSON. And that is a distance of how far?

Mr. RALPH. Two and a half miles.

Mr. SAMUELSON. In a straight line?

Mr. RALPH. Yes.

Mr. SAMUELSON. And the river is fairly straight at that point?

Mr. RALPH. Yes, sir.

Mr. SAMUELSON. You state that you obtained some grasses at George Watson's place?

Mr. RALPH. Yes.

Mr. SAMUELSON. At what place on George Watson's place did you obtain this grass?

Mr. RALPH. On the tract of land that he has in section 5, the lot he has on section 5, and near the river bank, and about one-third of the distance across north and south from the north line.

Mr. SAMUELSON. How far was that from the edge of the water, as it was at that time?

Mr. RALPH. It was near the edge of the water.

Mr. SAMUELSON. As it was at the time you took the sample?

Mr. RALPH. Yes, sir.

Mr. SAMUELSON. What was the elevation of the water at the time that you took the sample of grass?

Mr. RALPH. 496.5.

Mr. SAMUELSON. And how far did you take this grass from the water's edge at 496.5?

Mr. RALPH. All within a foot or two of the water's edge.

Mr. SAMUELSON. Did you notice upon George Watson's land that the water had been at a higher elevation than the place where you took the grass?



Mr. RALPH. Yes, sir.

Mr. SAMUELSON. And the point where you took these grasses on George Watson's land was from a portion of the land that had been overflowed?

Mr. RALPH. Yes, sir.

Mr. SAMUELSON. So that at the place where you took these grasses, the soil where you took them had been affected by the water?

Mr. RALPH. Yes, sir.

Mr. SAMUELSON. And you know, do you not, that at the time that you took these samples George Watson's land had been subjected to an overflow for something over three years' time?

Mr. RALPH. Where I took these samples?

Mr. SAMUELSON. Yes.

Mr. RALPH. No, sir.

Mr. SAMUELSON. You do know that the water had been maintained at a level on George Watson's at an elevation of about 498 for a good considerable portion of the time for years?

Mr. RALPH. No, sir; but I know that it has been up there.

Mr. SAMUELSON. You know that it has been up there?

Mr. RALPH. What elevation do you say?

Mr. SAMUELSON. 498.

Mr. RALPH. Well, probably 496.6, or 497.6, I should say.

Mr. SAMUELSON. If the water at International Falls is at a level of 497, what would be the elevation of the water at George Watson's place?

Mr. RALPH. I could not tell you; you would have to determine it; there is no way of telling what the difference would be; the difference varies—the difference between Rainy Lake and the water at the dam varies continuously in elevation.

Mr. SAMUELSON. But the water of Rainy Lake is continually higher than the water at the dam?

Mr. RALPH. It is as high or higher.

Mr. SAMUELSON. And the soil that you took upon George Watson's place—how close was that soil taken from the water's edge at the time that you took it?

Mr. RALPH. I stated before, within 2 or 3 feet.

Mr. SAMUELSON. What was the contour of the land lying between the point where this sample was taken and the edge of the water?

Mr. RALPH. It was nearly level.

Mr. SAMUELSON. You could tell from the soil where you took this sample that the waters had come above this point?

Mr. RALPH. Yes.

Mr. SAMUELSON. And the action of the rising and lowering of the water had affected the soil at that place?

Mr. RALPH. Yes, sir.

Mr. SAMUELSON. And the soil that you have brought here is some of the soil that was taken from that place?

Mr. RALPH. Yes, sir.

Mr. SAMUELSON. Now, with reference to the soil that you got upon Thomas Watson's place, where did you take that?

Mr. RALPH. I took that near the edge of the water and in the grass lawns along the water.

Mr. SAMUELSON. And the elevation at the time you took it was 496.5?

Mr. RALPH. Yes, sir.

Mr. SAMUELSON. At Watson's place?

Mr. RALPH. Yes.

Mr. SAMUELSON. Do you know what the elevation was at the dam?

Mr. RALPH. No, sir.

Mr. SAMUELSON. And where did you get the grass, the sample of which you have brought in here?

Mr. RALPH. I got it at the north boundary of his land, near the water's edge, about midway across the land, from east to west.

Mr. SAMUELSON. The grass that you have produced here was grass that has been subjected to the action of the water?

Mr. RALPH. It was low-land grass.

Mr. SAMUELSON. It had been subjected to the action of the water?

Mr. RALPH. I do not know just what you mean.

Mr. SAMUELSON. Water had affected that grass?

Mr. RALPH. Yes, in a sense.

Mr. SAMUELSON. You are not prepared to say that the grass in the condition in which you got it was the same as the grass would have been if Rainy Lake and Rainy River had not been artificially controlled?

Mr. RALPH. I do not think there would have been much difference.

Mr. SAMUELSON. Are you prepared to say there would have been no difference?

Mr. RALPH. The grass was obtained at elevation 496, and in one year out of two there would have been no difference—the water would affect it just the same.

Mr. SAMUELSON. I will ask you whether or not you were familiar with that country prior to the time when Rainy River and Rainy Lake were artificially controlled?

Mr. RALPH. I am speaking from the knowledge I have of the water elevations in Rainy Lake. Much of it—some of it—was gained from the reports of the consulting engineers of the commission.

Mr. SAMUELSON. You are not speaking from personal experience?

Mr. RALPH. Not for any great length of time.

Mr. SAMUELSON. And if these settlers have testified that they raised hay upon the meadowlands between meander lines and at an elevation of 496 you would not dispute that, would you?

Mr. RALPH. I would not. They might raise it as low as 493 in 1910 and 1911, those extremely low years.

Mr. SAMUELSON. And the waters in Rainy Lake and Rainy River were not artificially controlled until the year 1913?

Mr. RALPH. I think they were.

Mr. SAMUELSON. What year were they artificially controlled?

Mr. RALPH. 1912.

Mr. SAMUELSON. And the dam at International Falls, by which those waters are controlled, is at an elevation of 497?

Mr. RALPH. Yes.

Mr. SAMUELSON. And the waters are kept at the elevation of 497 a great portion of the year?

Mr. RALPH. No, sir.

Mr. SAMUELSON. Do you say that from your own knowledge?

Mr. RALPH. From the knowledge I have gained from examining the reports of the consulting engineers of the commission and from



the knowledge I have gained in keeping records of the elevation of the water here during the last seven or eight years while in the employ of the State of Minnesota from 1908 until 1913.

Mr. SAMUELSON. What portion of the year are the water levels at the dam maintained here at 497?

Mr. RALPH. I could not tell you, but it is a small portion; some years more than others. Some years it is not up to 497 at all.

Mr. SAMUELSON. In 1912 it was maintained at 497 for a period of four months, was it not, starting in with the month of July, during July, August, September, October, and into November? During those months the waters were maintained at a level of more than 497, were they not, at the dam here?

Mr. RALPH. I could not tell you. I would have to consult the records.

Mr. SAMUELSON. Were these samples of soil that you have brought here before the committee taken in comparatively the same location upon each of the lots from which they were taken as the soil that you have already described as having been taken from Mr. Watson's land?

Mr. RALPH. Yes, sir.

Mr. SAMUELSON. At about the same elevation and at about the same distance from the water's edge?

Mr. RALPH. Well, not always the same distance, but at about the same elevation, but near the water's edge.

Mr. SAMUELSON. And wherever you took these samples of soil, was the contour of the land between the water's edge and the place where you took these samples practically level?

Mr. RALPH. Yes, sir.

Mr. SAMUELSON. So that if the water had been at a level of 498 the place where you took the soil would have been submerged?

Mr. RALPH. Yes, sir.

Mr. SAMUELSON. And the grasses, samples of which you have brought in, were also taken from the various places at or about the same elevation?

Mr. RALPH. Yes, sir.

Mr. SAMUELSON. And about the same distance from the edge of the water as it then existed?

Mr. RALPH. Yes.

Mr. SAMUELSON. And if the water had been at an elevation of 498, the land where you took these particular grasses would have been submerged?

Mr. RALPH. Yes.

Mr. SAMUELSON. And whenever the water was at an elevation of 497 at the dam at the International Falls, then the particular piece of land from which you took this vegetation would have been submerged?

Mr. RALPH. Yes, sir.

Mr. SAMUELSON. In speaking of the value of the land to these settlers, and fixing the value between the meander line and elevation 496 at nothing, have you taken into consideration the fact that these people have cut bluejoint hay from that land at a value, upon the land itself, without having to move it, at a price of \$10 per ton?

Mr. RALPH. I do not doubt that; they have cut hay in there in the dry seasons of 1910-11.

Mr. TAWNEY. Is there any testimony that bluejoint hay was sold on the land at \$10 a ton?

Mr. SAMUELSON. Yes.

Mr. TAWNEY. I thought that was the market value here.

Mr. SAMUELSON. No; the market value here testified to was \$13 and \$14 a ton. There was testimony to the effect that it was worth \$10 a ton on the land and that it cost about \$3 per ton to place it in the stack.

Mr. MIGNAULT. I think the witnesses said that.

Mr. SAMUELSON. If land is of such a character that you can raise from a ton and a half to 4 tons of bluejoint grass hay upon it per acre, would you not consider that that land was worth more than \$8 or \$10 per acre?

Mr. RALPH. If you could raise hay on it year after year or have any assurance of raising hay any particular year, it might have a value; but when you have no assurance you can get a crop off it in any year, it has no value in this locality.

Mr. SAMUELSON. You know, do you not, as a fact that in this particular country the stock depend or has depended entirely upon the bluejoint grass that has been raised right in this country?

Mr. RALPH. No, sir. I know on the uplands in Koochiching County they raised clover and timothy and redtop, and do not have to depend upon bluejoint grass.

Mr. SAMUELSON. For how long has that condition existed?

Mr. RALPH. I could not tell you.

Mr. SAMUELSON. You have not followed that line?

Mr. RALPH. No.

Mr. SAMUELSON. Now, if you will answer my question: Assuming you could get a crop of hay three years out of four, and you could raise from  $1\frac{1}{2}$  to 4 tons per acre on that land, and that hay was of the value of \$10 a ton in the stack upon the land, what would you say land of that kind was worth?

Mr. RALPH. It would have some value if you could be sure of getting it.

Mr. SAMUELSON. Answer my question; it is a hypothetical question.

Mr. TAWNEY. He has answered it.

Mr. SAMUELSON. How much value?

Mr. RALPH. I assume hay land that you can grow hay on and be sure of getting a crop every year, in the vicinity of Rainy Lake, and in the vicinity of the lands in question, is worth at the present time about \$8 to \$10 per acre, and, if you could only be sure of getting a crop three years out of four, it would be worth one-fourth less than that; it would not be worth that, because you would be losing your time.

Mr. SAMUELSON. Now, then, let us try it again. Assuming I had a piece of land on Rainy River on which I could raise hay three years out of four and raise all the way from a ton and a half to 4 tons of hay on an acre, and I could sell it at \$10 a ton upon the land itself, what would an acre of land of that kind be worth?

Mr. MIGNAULT. I think he has answered it. However, answer it again, so that there will be no difficulty.

Mr. RALPH. I said that I placed the value of hay land in the vicinity of these lands in question at about \$10 per acre, from \$8 to



\$10 per acre, and that land that you could only get a crop on three years out of four would be at least worth one-fourth less than land from which you could get a crop four years out of four.

Mr. SAMUELSON. On what would you base your value of \$8 to \$10 per acre?

Mr. RALPH. On the value of lands in this locality as they are being offered and are purchased for at the present time.

Mr. SAMUELSON. Do you know what the assessed value of these lands is, that are located in Koochiching County?

Mr. RALPH. No, sir.

Mr. SAMUELSON. Don't you know, as a matter of fact, lands are assessed for taxation purposes at a greater price than the price that you have placed on them?

Mr. RALPH. I presume some lands are—improved lands with buildings.

Mr. SAMUELSON. Are you not aware of the fact that the unimproved lands in the territory which you have described—that is, the settlers' lands—are assessed for taxing purposes at a higher price than from \$8 to \$10 an acre?

Mr. RALPH. No.

Mr. SAMUELSON. You do not know that?

Mr. RALPH. No.

Mr. SAMUELSON. Do you own any lands in Koochiching County yourself?

Mr. RALPH. No; I have lands just south of Koochiching County, in Itasca.

Mr. SAMUELSON. But you have none in this county?

Mr. RALPH. No.

Mr. SAMUELSON. Have you ever sold any lands in this county?

Mr. RALPH. No.

Mr. SAMUELSON. Have you ever bought any lands in this county?

Mr. RALPH. No; I have appraised lands and talked of buying lands with people and got prices.

Mr. SAMUELSON. But personally you have never bought nor sold?

Mr. RALPH. No.

Mr. RICHARDSON. Is there any reason why you have not bought?

Mr. SAMUELSON. This is objected to as being irrelevant and immaterial.

Mr. MIGNAULT. The objection is reserved. I think it is relevant.

Mr. RALPH. The reason why I have not bought any lands on the Rat Root River in the vicinity of Rainy Lake and around the lands in question is because there would be no money in it; the lands are of no value.

#### TESTIMONY OF MR. C. S. BENSON, OF MINNEAPOLIS, MINN.

C. S. BENSON, after being duly sworn, testified as follows:

Mr. RICHARDSON. Where do you reside, Mr. Benson?

Mr. BENSON. In Minneapolis.

Mr. RICHARDSON. Where did you reside before you went to Minneapolis?

Mr. BENSON. In St. Cloud.

Mr. RICHARDSON. How long have you resided in Minneapolis?

Mr. BENSON. About six years.

Mr. RICHARDSON. How long have you been in Minnesota?

Mr. BENSON. Between 59 and 60 years.

Mr. RICHARDSON. What opportunities have you had to observe agricultural conditions and land conditions in northern Minnesota?

Mr. BENSON. I have traveled it in various capacities for the last 35 years or more and have been employed in drainage work. I have also, in the northern and western part of the State, been in the real-estate business.

Mr. RICHARDSON. How recently have you been about the northern part of the State on agricultural errands, and in what connection?

Mr. BENSON. A year ago last summer I was in the real estate business and was taking people from the southern part of the State up into Wilkins County. A year before that I was in the drainage business over in Red Lake County. Possibly that might have been one year back of that. I would have to figure pretty hard to tell you those years. It may have been two years back. I was in the real estate business the last two seasons, 1913 and 1914.

Mr. RICHARDSON. Have you been about any with State exhibits?

Mr. BENSON. Yes, sir; for several years.

Mr. RICHARDSON. Tell us about that.

Mr. BENSON. I was for three seasons with the Minnesota exhibition car sent out by the State Board of Immigration. We went through the States of Illinois, Iowa, Missouri, Nebraska, and a little of Kansas.

Mr. RICHARDSON. What was the purpose of that exhibition car, and what part did you take in its operation?

Mr. BENSON. We were exhibiting the products of the State, principally agricultural products, with some mineral and timber specimens, etc., to the people of those States and endeavoring to induce immigration to Minnesota.

Mr. RICHARDSON. In that connection had you made any particular study of agricultural products?

Mr. BENSON. Yes, sir.

Mr. RICHARDSON. Was it any part of your duty to do any talking about them?

Mr. BENSON. That was the principal part of my business during the daytime.

Mr. RICHARDSON. Had you laid a foundation for that work?

Mr. BENSON. My usual experience was the foundation; not specially.

Mr. RICHARDSON. What other positions in connection with State work have you occupied?

Mr. BENSON. I have spent quite a little time with the drainage commission as inspector on various works and with the bond companies as superintendent.

Mr. RICHARDSON. Are you familiar with the character and quality of lands and vegetation in this part of the State?

Mr. BENSON. I have been making quite an inspection of lands and the quality of lands, but the vegetation I have not seen a great deal of.

Mr. RICHARDSON. How long have you been familiar with the value of lands in Koochiching County?



Mr. BENSON. My investigations that were begun about 30 days ago as to the value of particular lands. I had been over the county somewhat before, but not a great deal.

Mr. RICHARDSON. For what purpose have you made your inspections and investigations?

Mr. BENSON. To endeavor to post myself in order to place a valuation on certain lands here at this meeting.

Mr. RICHARDSON. Looking at the map marked "Minnesota Exhibit D" and the portion of the lands marked in green, have you been in that vicinity?

Mr. BENSON. Yes, sir. That portion here [indicating] I have been over quite frequently.

Mr. RICHARDSON. With regard to uplands in that part of the county, where those State lands are located, have you formed an opinion as to values?

Mr. BENSON. I have, on certain lands.

Mr. TAWNEY. Mr. Richardson, at this point it might be well to note that this testimony in regard to value of State lands will be received subject to the objection of the assistant attorney general of the State of Minnesota, just the same as the testimony of Mr. Ralph was received.

Mr. RICHARDSON. Speaking generally, Mr. Benson, what is the fair value of the upland portion of lands in the neighborhood of those indicated on Minnesota Exhibit D?

Mr. BENSON. The lands in this portion up in here are higher and of more value than are the lands as you work down the river in this direction.

Mr. TAWNEY. You say "the lands up here." Just indicate by sections what lands you refer to.

Mr. BENSON. I shall have to refer to minutes to locate all of them correctly.

Mr. TAWNEY. You can indicate it on the map which is before you. You said that "up here" the lands are mostly upland. I want you to indicate in some way just where you mean.

Mr. RICHARDSON. Give use the sections you spoke of when you referred to a certain portion.

Mr. BENSON. I was endeavoring to locate some particular point. There are sections 4 and 9, lots 9, 11, and 13. They are the property of Mr. Heinemann. Those are rather low. There is a little upland there that is fair land, but the most of it is very low land and of little value. Across the river from that is Mr. George Watson's land. His land is in section eight. Those lands are higher and of more value than the lands on the other side of the river. The Thomas Watson land, a portion of it, is fair land, but it runs off on a gradual slope into the swamp, where it is practically of no value.

Mr. TAWNEY. At what would you estimate the value of the land there in dollars and cents?

Mr. BENSON. Of that which I have spoken of, the George Watson land is the most valuable.

Mr. TAWNEY. In your judgment, what is it worth in dollars and cents?

Mr. BENSON. There is but little of that George Watson land that is affected by water. I think it is worth from \$25 to \$35 an acre, exclusive of improvements.

Mr. RICHARDSON. What part of the land do you mean?

Mr. BENSON. The lands that lie between the railroad and the Thomas Watson lands; the northwest quarter of the southeast quarter; the northeast quarter of the southwest quarter, and the east half of the northwest quarter. I think I have given that correctly. I am not very familiar with handling land by sections, township and range.

Mr. TAWNEY. Well, we have the exact description of that land in Settlers' Exhibit A. If you will just indicate the land by name we will have the exact description.

Mr. RICHARDSON. Speaking generally of the upland, what, in your opinion, is the value per acre of the upland portion of these lands through that section?

Mr. BENSON. Oh, from \$5 to \$6 an acre; some of it a little more.

Mr. RICHARDSON. The land which is not upland, that which is below the upland; speaking of that in the same way, what is the fair value?

Mr. BENSON. It has very little value.

Mr. RICHARDSON. What do you mean by that?

Mr. BENSON. I mean that I do not know of anything that you could do with it to produce anything that would give a man a living out of it under present conditions.

Mr. MIGNAULT. What do you mean by present conditions?

Mr. BENSON. The stage of water as it is to-day.

Mr. RICHARDSON. By "to-day" what do you mean?

Mr. BENSON. The month of June.

Mr. RICHARDSON. Have you made any examination as to lands marked on Minnesota Exhibit E in green? They are in the Kabetogoma Lake district.

Mr. BENSON. No; I have not.

Mr. RICHARDSON. You have examined, have you not, Mr. Benson, a number of tracts of land of individuals along Rainy Lake and down the Rat Root, in addition to the State lands?

Mr. BENSON. Yes, sir.

Mr. RICHARDSON. In a general way—because we are very much pressed for time—will you state what the value of the uplands were that you examined?

Mr. BENSON. There is a great variation in them. Perhaps it might assist some if I elaborated a little on that.

Mr. RICHARDSON. We are very much pressed for time, Mr. Benson.

Mr. BENSON. From Erickson's on Rainy Lake around to Watson's place, exclusive of the two places, I can not see anything to it. The very highest and the best of it is worth not to exceed from \$6 to \$8 an acre.

Mr. RICHARDSON. As to the lowland below the upland and commencing from the upland and running down?

Mr. BENSON. Four dollars or five dollars, possibly. I do not know how they would get that out of it. That is a broad way of speaking.

Mr. RICHARDSON. You have no personal knowledge of the vegetation upon that land?

Mr. BENSON. Not on those specific tracts, although I have knowledge of similar tracts in Koochiching County. I would like to correct a statement I made, that I had no knowledge of the vegetation,



because there is some of the land on which snow is not deep and on which the vegetation shows, but I could not say anything as to the grasses and finer things.

Mr. RICHARDSON. Are you able to tell the value of the soil as well when it is in a frozen condition as when it is not frozen?

Mr. BENSON. Possibly not.

Mr. RICHARDSON. The State of Minnesota has always been considered a good agricultural State, has it not?

Mr. BENSON. I have been advertising it that way a good many years.

Mr. RICHARDSON. You are not ashamed of the condition, either of its soil or its products?

Mr. BENSON. Taking the State at large, I think it compares well with any of them.

Mr. RICHARDSON. You have so advertised it?

Mr. BENSON. I have.

Mr. RICHARDSON. And you have been paid by the State of Minnesota for advertising it along those lines?

Mr. BENSON. Yes, sir.

Mr. RICHARDSON. For the purpose of praising it rather than for running it down?

Mr. BENSON. Yes, sir.

#### TESTIMONY OF HERMANN KOENEKE, OF INTERNATIONAL FALLS, MINN.

HERMAN KOENEKE, after being duly sworn, testified as follows:

Mr. TAWNEY. You live here in International Falls. Mr. Koeneke, do you?

Mr. KOENEKE. Yes, sir.

Mr. RICHARDSON. How long have you lived here?

Mr. KOENEKE. It will be 12 years next May.

Mr. RICHARDSON. What has been your business?

Mr. KOENEKE. Dairying and truck gardening. Truck gardening has been my business mostly during the last three or four years.

Mr. RICHARDSON. Where were your gardens?

Mr. KOENEKE. The last three years they have been right here on the town site, about three blocks from here.

Mr. RICHARDSON. Have you become familiar with lands in this county along Rainy Lake and Rainy River and up Rat Root River?

Mr. KOENEKE. Well, I have along Rainy Lake and down the river here for 5 or 6 miles, but not on Rat Root River any farther up than Black Bay.

Mr. RICHARDSON. Are you familiar with the vegetation that grows in the swamp in this part of the country?

Mr. KOENEKE. Yes. That is, you refer to the grasses that grow up there?

Mr. RICHARDSON. Yes.

Mr. KOENEKE. Yes.

Mr. RICHARDSON. Now, with regard to the grasses, as a general rule, what kind of grass grows next below the upland; that is, commencing at the upland and going down to the swamp. What do you expect to find first?

Mr. KOENEKE. Do you mean next to the timber line?

Mr. RICHARDSON. Yes.

Mr. KOENEKE. It is generally a fine short grass for some little distance; I do not know the name of it, but we commonly call it wire grass. It is not the regular wire grass, though. It is a little finer grass than the wire grass.

Mr. RICHARDSON. Is it a swamp grass?

Mr. KOENEKE. You always find it on low land, as a rule. You will not find that kind of grass on high land.

Mr. RICHARDSON. What do you say as to its sparseness?

Mr. KOENEKE. As to what?

Mr. RICHARDSON. As to whether it grows thickly or whether it is scattered?

Mr. KOENEKE. It grows quite thickly in some places, but, as a rule, it does not get very high.

Mr. RICHARDSON. As you come down toward the water what is the next grass that you generally expect to find?

Mr. KOENEKE. We used to call it red-top. I heard them speak of it here as bluejoint, but it is the same thing.

Mr. RICHARDSON. How high does that grow?

Mr. KOENEKE. That is pretty heavy grass. I would say that usually it grows from  $2\frac{1}{2}$  to  $3\frac{1}{2}$  and 4 feet high.

Mr. RICHARDSON. Is there any particular time when that should be cut in order to get the value out of it?

Mr. KOENEKE. For feed; yes.

Mr. RICHARDSON. At what period?

Mr. KOENEKE. Of course, it depends somewhat on the season, whether it is early or late season, but usually it is cut along about the first part of August or the last part of July.

Mr. RICHARDSON. Is it ripe at that time?

Mr. KOENEKE. No, sir.

Mr. RICHARDSON. Why is it cut before it is ripe?

Mr. KOENEKE. Because if it were cut too late it would be a little woody and would not make good feed.

Mr. RICHARDSON. About how long before it matures must it be cut to make feed?

Mr. KOENEKE. I could not state any definite time for that, but it should be cut anyway before it had any frost to be any good for feed.

Mr. RICHARDSON. And also before it ripens, you say?

Mr. KOENEKE. Yes.

Mr. RICHARDSON. Generally speaking, within what period of the summer must it be cut?

Mr. KOENEKE. If I remember rightly, we generally cut it along the latter part of July or the first of August.

Mr. RICHARDSON. That is somewhere between the last of July and the middle of August, would you say as the extreme limits?

Mr. KOENEKE. Well, the extreme limit, I would say, is the 1st of September, but for myself I would not consider it very good feed after the middle of August; it would be getting too ripe.

Mr. RICHARDSON. And too hard and woody?

Mr. KOENEKE. And too hard and woody to make good feed. Of course, it stays green until it freezes. It does not get ripe like grain will; that is, it does not turn yellow. It stays in a green state until it does freeze.



Mr. RICHARDSON. You have some knowledge with respect to land and land values in this county, have you not?

Mr. KOENEKE. Oh, yes.

Mr. TAWNEY. Mr. Richardson, before he answers any more questions along that line I would like to ask him a question or so about these grasses that you are speaking of. When they are cut and put up into hay stacks, Mr. Koeneke, what do you pay for that hay on the land? Take the hay from the lowlands first: that which you say must be cut at a certain time.

Mr. KOENEKE. This bluejoint or redtop.

Mr. TAWNEY. Yes.

Mr. KOENEKE. Well, I put dependence in where it is located. It would depend on how far you would have to go after it, but I have bought hay up here above Ranier about 4 miles at from \$8 to \$10 a ton.

Mr. TAWNEY. In the stack?

Mr. KOENEKE. Yes.

Mr. TAWNEY. Is there a good road upon which to bring it out?

Mr. KOENEKE. There is a good winter road, but at that time there was no summer road at all.

Mr. TAWNEY. You bring it in in the winter, usually, do you?

Mr. KOENEKE. Yes; we always haul it in the winter.

Mr. RICHARDSON. There were not any roads here then, were there?

Mr. KOENEKE. No, sir.

Mr. RICHARDSON. With regard to lands, are the lands on Rainy River more or less valuable than those up Rainy River from a point, say, a mile and a half to two miles east of Ranier?

Mr. TAWNEY. You say Rainy River. Do you mean Rainy Lake?

Mr. RICHARDSON. Rainy River and Rainy Lake. I believe it is really Rainy Lake River.

Mr. KOENEKE. For agricultural purposes I would consider the land down the river more valuable.

Mr. RICHARDSON. Why?

Mr. KOENEKE. I think the land lies better. It is not so stony and it is not so cut up with little pieces of lowland as the other.

Mr. RICHARDSON. With regard to the lands east of Ranier and running up to Jackfish Bay and Black Bay, where you are familiar, describe generally their character with a view to agriculture.

Mr. KOENEKE. It is pretty hard to describe that, because it varies so. At some places it is sandy, and at other places it is quite stony, and at other places it has quite a good deal of muskeg, while at still other places it is black, shiny loam with clay underneath to the extent of probably 4 or 5 inches; in some places probably not that much. It varies very much.

Mr. RICHARDSON. Well, take it as a general rule; what is the value of the upland portion of those lands which lie up the lake in that vicinity?

Mr. KOENEKE. Do you mean the land just as it is with brush and timber on it and without its being cleaned up?

Mr. RICHARDSON. Yes; being the upland part.

Mr. SAMUELSON. That is objected to on the same ground; that the witness has not shown himself qualified to answer as to values.

Mr. TAWNEY. The witness may answer the question subject to the objection.

Mr. KOENEKE. I understand the question, but it is pretty hard to put a value on that land. I have 80 acres up there that I would take \$10 an acre for. It is about 3 miles this side of Jackfish Bay, I guess three-quarters of a mile back from the lake.

Mr. RICHARDSON. Would you be pretty glad to sell it for that?

Mr. SAMUELSON. I object to the form of the question.

Mr. TAWNEY. Well, would you sell it for that?

Mr. KOENEKE. I would not sell it for \$10 an acre.

Mr. TAWNEY. How far back from the lake is it?

Mr. KOENEKE. I am not certain, but I would say about a mile; from three-quarters of a mile to a mile.

Mr. TAWNEY. Is any of the land affected by the water?

Mr. KOENEKE. No; it is not.

Mr. RICHARDSON. Can you tell us what section it is in?

Mr. KOENEKE. No; I can not.

Mr. RICHARDSON. You have not that in mind?

Mr. KOENEKE. No; I have owned it for 10 or 11 years, but I could not give you the description offhand.

Mr. TAWNEY. What is the character of the land? Is it agricultural land or hay land?

Mr. KOENEKE. I would call it agricultural land, if it was cleaned off. Some of it is pretty stony, but most of it is pretty good land if cleaned off.

Mr. RICHARDSON. How many acres have you?

Mr. KOENEKE. Eighty acres.

Mr. RICHARDSON. Will you describe it in a general way?

Mr. KOENEKE. I would say that about half of it is pretty good land, but it lies flat and has pretty heavy timber on it—poplar, Balm of Gilead, balsam, spruce, and some tamarack, but not much. The rest of it is quite stony and a little rolling, and has not much valuable timber on it. It is a little scrubby. There is not much soil there.

Mr. TAWNEY. Would the timber that is on it pay for clearing it?

Mr. KOENEKE. I do not think so.

Mr. RICHARDSON. The timber up through that region has not much value commercially, has it?

Mr. KOENEKE. I could not say. I do not know.

Mr. RICHARDSON. Well, it is pretty much of the same character as yours, is it not?

Mr. KOENEKE. Well, as a rule I guess it is. In places it varies. In some places there is quite a bit of spruce and in other places quite a bit of pine.

Mr. RICHARDSON. Outside of the spruce and pine it is of the same character?

Mr. KOENEKE. Outside of the spruce and pine it runs a good deal the same.

Mr. RICHARDSON. What knowledge have you of land values in this county?

Mr. KOENEKE. I have bought and sold different pieces of land here, and have lived here for the last 13 years.

Mr. RICHARDSON. Have you known of other sales besides those in which you were interested?

Mr. KOENEKE. Yes; I have.

Mr. RICHARDSON. Have you known about the prices that were paid, the going prices?



Mr. KOENEKE. No; I could not say as to that.

Mr. RICHARDSON. Well, I do not mean to have you repeat them, but as you heard about the sales you learned about the prices, did you not?

Mr. KOENEKE. Yes. It has been all the way from \$10 to \$100 an acre.

Mr. RICHARDSON. What land was the land that sold for \$100 an acre?

Mr. KOENEKE. That was land that sold for a residence, an acre lot in the suburbs.

Mr. RICHARDSON. For summer resort purposes?

Mr. KOENEKE. Well, I do not know what that man bought it for.

Mr. RICHARDSON. As to the swamp lands, what are they fairly worth, in a general way?

Mr. KOENEKE. I myself would not give much for them.

Mr. RICHARDSON. What do you mean by that?

Mr. KOENEKE. I would not want them for a farm.

Mr. RICHARDSON. Why not?

Mr. KOENEKE. They are too wet, or they are too low; you could not raise crops on them outside of hay that would pay you for your labor.

Mr. SAMUELSON. Mr. Koeneker, the soil of this particular part of the country is very productive, is it not?

Mr. KOENEKE. Yes, sir.

Mr. SAMUELSON. Have you ever farmed any place, Mr. Koeneker, where the soil was better adapted for vegetables than it is right here?

Mr. KOENEKE. I have not.

Mr. SAMUELSON. You get larger crops here than you got in any other place where you ever farmed or raised agricultural crops; that is, in the vegetable line?

Mr. KOENEKE. Yes, sir; in the vegetable line.

Mr. SAMUELSON. This country is particularly good for that?

Mr. KOENEKE. Yes, sir.

Mr. SAMUELSON. Have you cleared any land here yourself, Mr. Koeneker?

Mr. KOENEKE. I helped clear some and hired some cleared. I know just what it cost me.

Mr. SAMUELSON. How much would you say that the average land around here would cost you per acre to clear it and get it ready for cultivation?

Mr. KOENEKE. About \$35.

Mr. SAMUELSON. Could you clear it and grub it and get it ready for cultivation for \$35 an acre?

Mr. KOENEKE. And not take the timber off. I mean land that has been cut over and has just stumps on it. I have not had experience with green stumps and timber that was standing. This land that I cleared had been cut over for several years.

Mr. SAMUELSON. That is, the land had been cut over so that the stumps were in a rotten or rotting condition, and taking that particular land while in that condition, it would cost you about \$35 an acre to clear it?

Mr. KOENEKE. Yes, sir. There were quite a few green stumps; for instance, birch and maple and Balm of Gilead. They were dead,

but there were quite a few of them; as well as the cedar and spruce and balsam.

MR. SAMUELSON. But the cost of clearing cut-over land would often run higher than \$35 an acre, would it not?

MR. KOENEKE. In some places it would and in others it would not. It is pretty hard to say unless you see the ground. It varies quite a bit.

MR. SAMUELSON. You would not want to take a contract to clear 500 acres of land in this northern country here that had been cut over at \$35 an acre and get it ready for agricultural purposes, would you?

MR. KOENEKE. No, sir.

MR. SAMUELSON. You have spoken, Mr. Koeneke, of the proper time to cut the bluejoint and redtop. You said that that time was from the middle of July to the first day of August. Is it not a fact that while you have been a resident of this county for some time the grass has not any more than started to grow along in July?

MR. KOENEKE. No: I do not think so.

MR. SAMUELSON. Well, there is very little growth of the hay crop in this country until the 1st of July, is there?

MR. KOENEKE. No; not so very much, but it grows very fast after the weather gets warm; say in two or three weeks from the 1st of July to the last of July it would make an awful growth.

MR. SAMUELSON. It would make a big growth from the 1st of July to the last of July, but until the 1st of July there is very little growth?

MR. KOENEKE. Well, the hay would not be fit to cut by the 1st of July, I do not think. It would be soft; there would be nothing to it; it would be too young.

MR. SAMUELSON. You stated that the hay would have to be cut before the frost came.

MR. KOENEKE. In order to be good feed; yes.

MR. SAMUELSON. What time do you usually get frost up in this country?

MR. KOENEKE. Usually along between the 7th and 12th of September.

MR. SAMUELSON. You have fed a good deal of that redtop and bluejoint yourself, have you not?

MR. KOENEKE. Yes, sir.

MR. SAMUELSON. You find that a very good quality of hay for cattle, do you not?

MR. KOENEKE. It is pretty good hay, although it is not as good as tame hay. Our cattle winter pretty good on it.

MR. SAMUELSON. You have fed it yourself right here to your cattle, and they have been good milk and cream producers, have they not?

MR. KOENEKE. Of course we feed bran with it.

MR. SAMUELSON. Where did you get the bran before the railroad came in here?

MR. KOENEKE. At Fort Frances.

MR. SAMUELSON. You did not feed any other kind of hay, though, except bluejoint and redtop at that time?

MR. KOENEKE. That was the only hay we could get here at that time.



Mr. SAMUELSON. The other people who were engaged in the milk business fed the same kind of feed?

Mr. KOENEKE. Yes, sir.

Mr. SAMUELSON. And the cattle thrived on that fairly well?

Mr. KOENEKE. Yes, sir.

Mr. SAMUELSON. You have even known of land selling in this country at more than \$100 an acre, have you not?

Mr. KOENEKE. Well, I could not swear to that. I have heard of it, but I do not know whether it is true or not.

Mr. SAMUELSON. You know that John Harwood sold his land for more than \$100 an acre, do you not?

Mr. KOENEKE. I do not know just what he did get.

Mr. SAMUELSON. You heard that he got more than \$100 an acre?

Mr. KOENEKE. I did not hear what he got. You refer to that Ranier property?

Mr. SAMUELSON. Yes.

Mr. KOENEKE. I forget now what he got.

Mr. SAMUELSON. You know that Ogaard got more than \$100 per acre for some land that he had out there?

Mr. KOENEKE. Yes; I bought five acres from Ogaard about eight or nine years ago at \$100 an acre.

Mr. SAMUELSON. Do you remember what Ed Ek got for his place up the river there?

Mr. KOENEKE. I do not know.

Mr. SAMUELSON. You know that Mr. Bedell is selling lots up there now at more than \$100 an acre, do you not?

Mr. KOENEKE. No; I do not know that. I do not know what the size of the lots are.

Mr. SAMUELSON. They are acre tracts.

Mr. KOENEKE. I could not say, because I did not pay any attention to it.

Mr. SAMUELSON. You do know that the lands lying up along Rainy Lake there are valuable for other purposes except merely agricultural purposes?

Mr. KOENEKE. Yes, sir.

Mr. RICHARDSON. And that those lands have other values except mere value for agricultural purposes?

Mr. KOENEKE. Yes, sir.

Mr. SAMUELSON. So that when you have stated the value of lands for agricultural purposes you do not mean to say that those lands are not valuable for other purposes, and that they have not a greater value than the value you have stated?

Mr. KOENEKE. No, sir.

Mr. RICHARDSON. For what purpose did you buy the five acres from Ogaard that you referred to?

Mr. KOENEKE. I intended to make that my home up there and truck garden.

Mr. RICHARDSON. Where was that?

Mr. KOENEKE. That was just above what is known as Meades Spring.

Mr. RICHARDSON. How far from the Ranier line?

Mr. KOENEKE. How far from the town limit?

Mr. RICHARDSON. Yes; from the line. Was it inside or outside of the limits of Ranier?

Mr. KOENEKE. I do not know just where the limits are, but I think it is a little over a mile from Ranier—about a mile and a quarter.

Mr. RICHARDSON. From what part of Ranier?

Mr. KOENEKE. From the town.

Mr. RICHARDSON. On the lake?

Mr. KOENEKE. Yes; it fronted 300 yards, I think, on the lake. I would not be sure about the 300 yards, but, anyhow, the 5 acres were in a square block, one side fronting on the lake.

Mr. RICHARDSON. Did you sell any of it?

Mr. KOENEKE. No, sir.

Mr. RICHARDSON. When did you dispose of it?

Mr. KOENEKE. I did not go through with the deal. I bought it on a contract and threw it up.

Mr. RICHARDSON. How much did you pay in?

Mr. KOENEKE. \$25.

Mr. RICHARDSON. You forfeited that rather than carry through the deal?

Mr. KOENEKE. Yes, sir.

Mr. RICHARDSON. Now, referring just briefly to the grasses again, what vegetation do you find just below the bluejoint coming down the swamp?

Mr. KOENEKE. There is the grass that grows between the bluejoint in the water: sometimes out in the water. It is cut for hay sometimes, but we always considered it was not very good. It does not get as high as bluejoint grass, and it is quite soft.

Mr. RICHARDSON. That is three cornered?

Mr. KOENEKE. As a rule. It forms leaves, but the stem where you cut it down near the ground is kind of three cornered.

Mr. RICHARDSON. When fed to stock what is the noticeable effect?

Mr. KOENEKE. Stock do not seem to like it as well as they do the bluejoint, and they do not seem to do as well; it does not seem to have the nutriment that the bluejoint has.

Mr. RICHARDSON. It causes a great deal of scouring, does it not?

Mr. KOENEKE. It does; especially if it is cut a little green.

(The following affidavit was received by Mr. Tawney from Mr. Ralph W. Barton, of Koochiching County, Minn., relative to the value of certain lands, located on the Rat Root River and the East Fork of said river, the same portions of the homestead claims of Alice M. and Daisy V. Clark:)

STATE OF MINNESOTA,

*County of Hennepin, ss:*

Ralph W. Barton, of the county of Koochiching and State of Minnesota, being first duly sworn, deposes and says that he has been a resident of Koochiching County for the past 12 years, 3 years of which he has spent upon a farm adjoining the land of Alice M. Clark hereinafter described.

That he knows of the location and nature of the land situated in the county of Koochiching and State of Minnesota located on the Rat Root River and the East Fork of said river and described as follows: Lots 12 and 13 section 3, township 69, range 23 west, the same being a portion of the homestead claim of Alice M. Clark; and lots 5, 8, and 10 and the southeast quarter of the southwest quarter of section 26, township 70, range 23 west, the same being a portion of the homestead claim of Daisy V. Clark.

That by reason of the newness and unsettled condition of the country and of the retarded development caused by the high water of the Rat Root River, with the consequent flooding of the lands there has been few actual transfers of land in the immediate neighborhood.



That the meadowlands upon the above-described lands produced prior to the flooded conditions and for the years 1910 to 1913, inclusive, an average of 1½ tons of hay to the acre; that the market value of hay, of the kind grown on said meadowland, has averaged about \$10 per ton for the past five years.

That affiant leased certain meadowland in the same neighborhood and of the same kind as the above-named land for the season of 1915, at a rental of \$4 per acre.

That he has worked upon the above-described land and knows the kind of soil it contains. That the soil is a heavy black loam with a clay subsoil.

That the cleared and meadow lands are scarce in the neighborhood of the above-described lands and owing to their scarcity and the great cost of clearing lands the meadowlands bordering the river has a far greater value to the homesteader than has the timbered or wooded lands lying back from the river.

That affiant knows of his own knowledge of negotiations now pending for the sale of partly cleared land in an adjoining township to the above-mentioned township 69 at \$30 an acre.

That affiant knows of his own knowledge of the sales of entirely wooded lands in near-by townships at \$15 per acre.

That affiant believes that the value of cleared and meadow land upon the above-described land to be not less than \$50 per acre and of the uncleared land upon the same land to be not less than \$15 per acre.

Further affiant saith not.

RALPH W. BARTON.

Subscribed and sworn to before me this 25th day of January, 1916.

IRVING J. CLARK,

*Notary Public, Hennepin County, Minn.*

My commission expires April 10, 1920.

### TESTIMONY OF LYMAN W. AYER, OF LITTLE FALLS, MORRISON COUNTY.

LYMAN W. AYER, having been duly sworn, testified as follows:

Mr. TAWNEY. Where do you live?

Mr. AYER. At Little Falls, Morrison County.

Mr. RICHARDSON. How long have you lived in the State?

Mr. AYER. Eighty-three years.

Mr. RICHARDSON. And how long have you been familiar with the northern part of the State here, where Koochiching County now is?

Mr. AYER. Between 30 and 40 years.

Mr. RICHARDSON. How came you to become familiar with it so long ago?

Mr. AYER. I suppose my age made me become acquainted with it.

Mr. RICHARDSON. When you first came up here, for what purpose did you come?

Mr. AYER. I came up for the purpose of seeing the capacity of this country for timber.

Mr. RICHARDSON. And what year was that?

Mr. AYER. It must be about 1905, I think; somewhere about that.

Mr. RICHARDSON. And what territory did you look over at that time?

Mr. AYER. I looked at the northern part of Minnesota here and Ontario, as far as it was tributary to this point.

Mr. RICHARDSON. On both sides of Rainy River and Lake?

Mr. AYER. On both sides of Rainy River and Lake.

Mr. RICHARDSON. How carefully?

Mr. AYER. I spent about six years, I think, and I put in most of my time at it.

Mr. RICHARDSON. Most of your time for six years?

Mr. AYER. Yes.

Mr. RICHARDSON. And in making that examination did you pay any attention to the soils and the vegetation?

Mr. AYER. Yes.

Mr. RICHARDSON. And did you report from time to time on the condition of the soils and vegetation and the agricultural possibilities of the lands on the American side?

Mr. AYER. My report would include the value of the timber and lands, and everything of that kind, though that was incidental to the timber.

Mr. RICHARDSON. How carefully were your examinations made?

Mr. AYER. I hardly know how to answer that. I did it with care with all the care I could command.

Mr. RICHARDSON. You were an experienced man in such matters?

Mr. AYER. I was.

Mr. RICHARDSON. And had been for many years?

Mr. AYER. Yes, sir.

Mr. RICHARDSON. How far, if you recollect, to the eastward did you go on those examinations?

Mr. AYER. I went east as far as Rat Root Lake on the international boundary.

Mr. TAWNEY. How far is that from International Falls?

Mr. AYER. I do not know as I could tell you exactly; it is a little northeast of Eley, a little east or north from Eley.

Mr. TAWNEY. How far is it, approximately—25 or 50 miles?

Mr. SAMUELSON. Seventy miles.

Mr. BACKUS. More than 100 miles.

Mr. RICHARDSON. How wide a stretch from Rainy Lake south or southerly did you cover?

Mr. AYER. All that was included in Koochiching County at the present time and part of what is included in Itasca County—the county has been divided.

Mr. RICHARDSON. In addition to parts of St. Louis County?

Mr. AYER. Yes.

Mr. RICHARDSON. Have you been in or about any parts of what is now Koochiching County since that time?

Mr. AYER. Since what time?

Mr. RICHARDSON. Since that time that you made your examination?

Mr. AYER. Not to do any work. I have been in the county sometimes, but I have not worked much in that country.

Mr. RICHARDSON. Have you been for many years familiar with land values?

Mr. AYER. Yes, sir.

Mr. RICHARDSON. In what kind of work have you acquired your knowledge of values?

Mr. AYER. I have been working for railroad companies—a good many years for the Northern Pacific, the Duluth & Wyoming, besides work I did for corporations.

Mr. RICHARDSON. In what particular way did you do the work for the railroad companies—what particular kind of work?

Mr. AYER. Well, the work I did for the railway companies was reporting on everything that was supposed to give value to the sev-



eral tracts of land—reporting on the choice location, soil surveys, nearness to railroad, near stations, the kind of road, character of the country for making roads, settlements, character of the settlements, and everything of that kind and went very largely into detail in my report.

Mr. TAWNEY. Have you worked for other interests of the same character?

Mr. AYER. Yes; I worked for Haycock & Co. They were the builders of this road.

Mr. RICHARDSON. That is what is known as the Canadian Northern—the Duluth, Winnipeg & Western?

Mr. AYER. Yes.

Mr. RICHARDSON. What agricultural experience have you had?

Mr. AYER. I was raised farming and I have a farm of my own. I am on a farm I bought over 60 years ago.

Mr. RICHARDSON. Are you familiar with swamp vegetation?

Mr. AYER. Yes, sir.

Mr. RICHARDSON. Will you state briefly what kinds of swamp vegetation are suitable for stock feeding and, in a general way, the stock-feeding values thereof?

Mr. AYER. Well, in the first place, there is a muskeg some people call muskeg swamp. Well, there is nothing in that at all. Then you come to the next class, which would be floating bogs, and such as that. Those are of little or no value. In the first place, you can not get on to them to make hay or grass and the hay is no good when it is made, and you don't have a ration of maintenance in it; that is, it won't make food for stock. Prof. Thatcher says the best of wild hay is about the same value as straw; that is, it will keep an animal over winter, but he will lose weight. It is not a full ration. He will not weigh as much in the spring as in the winter, and he ought to weigh more.

Mr. RICHARDSON. In your experience have you become familiar with land values, values of upland and values of lowland or swamps?

Mr. AYER. Yes. I would like to say that when you ask for values, I would want a basis to go upon. Values of what?

Mr. RICHARDSON. Looking at this map, which is marked Minnesota Exhibit D, do you observe some parcels of land colored green?

Mr. AYER. Yes, sir.

Mr. RICHARDSON. In and about Rat Root River and down toward the lake?

Mr. AYER. Yes.

Mr. RICHARDSON. Explain about the values of the lands and the different kinds of lands in there?

Mr. AYER. Well, sir, in that part of the country and on the Rat Root I have had considerable experience over there, and I do not value them at all.

Mr. RICHARDSON. You mean to your mind they have no value?

Mr. AYER. No.

Mr. RICHARDSON. Why?

Mr. AYER. Because the more a man had of it, the poorer he would be.

Mr. RICHARDSON. Explain that a little further?

Mr. AYER. He would probably have to pay taxes on them, and if he paid anything for taxes he would pay too much for the land.

Mr. TAWNEY. Do you think the more land he had the more taxes he would have to pay, and the more taxes he would have to pay, the poorer he would be?

Mr. AYER. Yes; he would have nothing to show for the taxes, and I am sorry for the man who has any land in that country. I spent two summers in there and I know what it is.

Mr. RICHARDSON. Look at this map, which is the Kabetogama Lake district, Minnesota Exhibit E; as I understand you, you also went through that country carefully?

Mr. AYER. Yes, sir.

Mr. RICHARDSON. Tell us about the values of lands in there.

Mr. AYER. Aside from the timber there is on it?

Mr. RICHARDSON. Yes.

Mr. AYER. There is no land I should call agricultural land in there, unless there is a spot of a little value in some place or another, that really I would not call it a farm.

Mr. RICHARDSON. Looking at this portion of the map which is marked green, and about the point there, and from there westerly—what about that land?

Mr. AYER. There is a few places along here, between the end of the lake and the portage, where there might be some hay cut, but the land is of no value.

Mr. RICHARDSON. To what extent is there hay land in there?

Mr. AYER. In dry years there would be some hay land, and in wet years there was not any that was available.

Mr. RICHARDSON. And what would be the value of the hay?

Mr. AYER. Away down there?

Mr. RICHARDSON. Yes.

Mr. AYER. Well, a man might get the hay for putting it up, and I don't know as he would get anyone to do that.

Mr. RICHARDSON. And what would be the value of the hay as a food product for stock?

Mr. AYER. It appears that when they did cut hay it was rather better than the average quality of the hay on the lands that have been discussed before; that is, on the Rat Root River; but I was going to say there would be more years that they would miss having any here than they would even on the Rat Root, but I do not know that there is much difference.

Mr. RICHARDSON. What do you mean when you speak of dry years?

Mr. AYER. When it don't rain; when it don't send the water.

Mr. RICHARDSON. What do you mean when you speak about the wet years?

Mr. AYER. I mean when there is more than the average or when there is an average of water, such as 1910 and 1911 were drought years.

Mr. RICHARDSON. Give us an example of what you would call an average year?

Mr. AYER. Well, last year was about an average year.

Mr. RICHARDSON. 1915?

Mr. AYER. 1915.

Mr. RICHARDSON. During the period that you were looking up lands in these localities, how often was it that anyone would be likely to get hay, or to get a season which would be productive of hay, under conditions as they were then?



Mr. AYER. On these lands?

Mr. RICHARDSON. Yes.

Mr. AYER. Well, about half the time, probably; he could not get hay every alternate year, but probably in the series of years he might get hay a part of it; it never was that I ever knew that you could get hay off all of it.

Mr. RICHARDSON. And, in a long period of years, you think that hay could not have been gotten for more than half of the period?

Mr. AYER. I think not.

Mr. RICHARDSON. And would you cut it at regular intervals, or at irregular intervals, in the long period?

Mr. AYER. Irregular.

Mr. RICHARDSON. In other words, you would not know from year to year whether you were going to get any next year or not?

Mr. AYER. No, sir.

Mr. RICHARDSON. Is that right?

Mr. AYER. That is right.

Mr. RICHARDSON. Now, in regard to stages of water, when you were up through there, do you recall anything about that?

Mr. AYER. Well, it is evident that the water some years ago was much higher than it is at the present time. My experience and my judgment takes in a series of years; there will be a series of wet years and a series of dry years. Take any of the small lakes, they have been drying up for the last 10 years.

Mr. RICHARDSON. In your examinations, did you pay attention to stages of water?

Mr. AYER. Yes, sir.

Mr. RICHARDSON. And have you a reasonably clear recollection about those stages as you observed them during those years?

Mr. AYER. Well, the average height of the water has been growing less, but take it along the international boundary, it drops from one lake to another. Away up at the head it is higher, and it depends a great deal on the height of water there what you get down here, and sometimes it drops very rapidly for some reason or other, and sometimes it is not so rapid.

Mr. TAWNEY. Do you recall 1876, 1877, 1878, and 1879? Were you up there?

Mr. AYER. No; I was not here in those days.

Mr. TAWNEY. You were not here those years?

Mr. AYER. No.

Mr. RICHARDSON. Did you have any particular experience that you now recall in regard to stages of water which you observed?

Mr. AYER. I remember at one time in upper Lake Namakin we were going up the river—working up—and measuring a certain rock, which stood out straight from the river, to see how high the point of it was above the water. When we went there it just covered the top of the rock, and when we went back there, in two or three weeks, it was down 7 feet.

Mr. MIGNAULT. What interval of time?

Mr. AYER. About three weeks. Each one of the lakes has an outlet, and some of the outlets appear to be insufficient to let the water out of the lake as fast as it comes in, and it will drop down and the next week it will be filled. There is quite a difference in the eleva-

tion of the lakes. I think there is 400 feet between the lake above and this lake, and the water in one locality drops into the next lake, and then that one fills the next one.

Mr. RICHARDSON. You are speaking of the various lakes that finally have their outlet into Rainy Lake and River, are you not?

Mr. AYER. Yes.

Mr. RICHARDSON. Do the months vary in which the height of water appears on these lakes?

Mr. AYER. Yes; it does very much.

Mr. RICHARDSON. Tell us about that, if you please.

Mr. AYER. Well, if there was a period of rainfall here in these lower lakes at the same time the upper lakes were emptying into it, it would naturally raise Rainy Lake much more rapidly than the water could get away. For instance, supposing the upper lake was just falling into the lower lake coincident with a period of great rainfall at that place, it would raise it more rapidly than otherwise. If they had a shower of 5 inches, they would have had much more than they would have had otherwise, because this lake is dropping into it; it took all the outflow for the original lake in the first place.

Mr. RICHARDSON. Have you seen times in the fall of the year where the water in the lakes tributary to Rainy Lake was very high?

Mr. AYER. Yes; I have.

Mr. RICHARDSON. How frequently?

Mr. AYER. Well, I do not know as I could tell you how many times, but it is very irregular.

Mr. RICHARDSON. And how about midsummer?

Mr. AYER. I do not think the water is much lower in midsummer. It is more in the spring, after the snow water first runs in; there would be the biggest rise if it should go off with the rain, but after that, I should say, one part would not be much more than another.

Mr. RICHARDSON. Do you know the place that has been spoken of as Gold Portage, between Black Bay and Kabetogama?

Mr. AYER. Yes.

Mr. RICHARDSON. In your examinations did you go through there?

Mr. AYER. Yes.

Mr. RICHARDSON. How?

Mr. AYER. Well, there was one time we got through in a kind of a canoe.

Mr. RICHARDSON. And in which direction were you going at that time?

Mr. AYER. I was going down; I never attempted to go up.

Mr. RICHARDSON. Can you point out the section on the map where it was that you came through?

Mr. AYER. Well, I do not know. It should be right down here. There has been evidently at one time a regular way through there. The water appears to run all the time, but the lakes have got lower and do not run the same.

Mr. TAWNEY. When was it you came through there with a canoe; what year?

Mr. AYER. I could not say that, either. It was one time—I guess that was before I was with the Ontario Water Power Co.

Mr. BACKUS. About 1900, was it not?



Mr. AYER. I think so. If I had thought you would want that, I have my minutes of a survey I made through there.

Mr. RICHARDSON. Will you look here at Kabetogama Lake? Here is Rat Root. Was that place you went through substantially where sections 13 and 19 or 24 was?

Mr. AYER. Yes; I know 13 and 19. It goes from this point up to that point [indicating on map].

Mr. RICHARDSON. You mean the arm that extends up toward section 19 from Kabetogama and the arm which extends down into 24 from Rat Root?

Mr. AYER. Yes; it runs in this kind of way—kind of letter "F." It used to be so; the Indians told me that there used to be a regular thoroughfare through there by water.

Mr. RICHARDSON. Referring to a place which has been called Kettle Falls, were you familiar with that?

Mr. AYER. Yes.

Mr. RICHARDSON. Now, taking that place years back, when you were through there, what, if anything, did you observe as to the water being held back there in any way in the lakes above?

Mr. AYER. Well, I do not know as I understand your question exactly.

Mr. RICHARDSON. Did the water go out of the channel there at Kettle Falls as rapidly as it came into the lake from above?

Mr. AYER. No; it did not.

Mr. RICHARDSON. Why not?

Mr. AYER. Because it is very narrow back there; the thoroughfare between the lakes is very narrow.

Mr. RICHARDSON. What was the effect in regard to raising water in Namakin Lake and lakes above that and Kabetogama?

Mr. AYER. Well, it would raise it, of course.

Mr. RICHARDSON. Well, how materially?

Mr. AYER. That would depend, as I said before, on the lake above; how fast it was going in. Of course the faster they were going in, only so much could go through anyway.

Mr. RICHARDSON. In other words, by the natural conditions there the water was throttled or bottled up, so that it had to come through a very narrow neck?

Mr. AYER. Yes.

Mr. RICHARDSON. And the result was it was held back all the time, and that increased as the quantity of water increased, did it not?

Mr. AYER. Certainly.

Mr. SAMUELSON. No questions.

Mr. TAWNEY. It is now 5 minutes to 12. I think we will close the hearing.

Mr. RICHARDSON. I merely want to state that we are prepared with a large number of additional witnesses.

Mr. TAWNEY. But we are not prepared to stay any longer.

Mr. GEORGE. I have some 13 or 14 witnesses to give evidence in respect to conditions on the Canadian side of the river.

Mr. TAWNEY. Along the shore?

Mr. GEORGE. Along the shore of Rainy River and also Rainy Lake and Frog Creek.

Mr. TAWNEY. You can make your application to the committee, and we will present it to the commission, the commission will de-

termine whether we will hear further testimony as to those conditions.

Mr. MIGNAULT. What would be the effect, briefly, of that evidence?

Mr. GEORGE. Evidence was given yesterday in respect of the erosion of the bank of Rainy River and the damage that has been done to property interests there. Now, evidence can be adduced on behalf of the power company that they are not responsible for that erosion. Evidence can be adduced in respect of the plot of land known as Pithers Point, that it has been flooded by natural conditions many, many times during the past 30 years, but that flooding is a natural condition. I was particularly anxious to give the evidence of some five or six lake captains who have had knowledge extending back 30 years in connection with the height of water at the various times during all of these seasons, some of whom kept records of it. I mentioned this because I had mentioned it last month to Mr. Magrath in Ottawa, and he asked me at that time to present that evidence at this hearing, because he said apparently it had been overlooked at the September hearing. Unfortunately, at that time I was unable to appear here.

Mr. TAWNEY. It was not overlooked by the commission. We were here, and there was nobody to be heard.

Mr. GEORGE. Unfortunately I was in eastern Canada at the time, and my clients did not know of that evidence.

Mr. TAWNEY. I can say that we will present this matter to our associates, and the same will apply to any additional evidence that Mr. Richardson may want to give. I think the best plan would be to defer any further evidence on the condition of Rainy River and Rainy Lake until you hear further from the commission.

Mr. RICHARDSON. I would like to call the attention of the commissioners to one point which has seemed to me extremely interesting, and that is the fact that there have been maintained a large number of dams on the Canadian side in streams tributary to Rainy Lake, and that I had prepared myself, with witnesses who had been familiar with those dams and the operation of them and the use of the streams for a considerable period of years, and as to the operation of those dams recently, for the purpose of showing that increases in the height of Rainy Lake from time to time are made by reason of the output from these streams and at times out of the ordinary; that is, the height of water would come into Rainy Lake at a period when it would not have come in had the natural conditions remained in the upper stream, and that in some instances Rainy Lake was materially raised thereby at a season of the year when grass and hay was in its prime.

Mr. TAWNEY. You mean under natural conditions heretofore?

Mr. RICHARDSON. Yes.

Mr. TAWNEY. Before the dam was built?

Mr. RICHARDSON. Yes; both before and after and at the present time.

Mr. TAWNEY. We can only say that these are matters which we will present to our associates, and we will consider the relevancy of the facts which you desire to present to the commission with respect to the report we will have to make to the two Governments, and if we deem it material and relevant there will have to be another hearing at International Falls for that purpose.



I want to say in conclusion, on behalf of the committee of the commission and on behalf of the commission itself that we sincerely appreciate the efforts you have made to assist us in getting the testimony and in arriving at the facts in regard to land values, and the extent of lands that will be affected by the various levels of the lake. The problem which the commission has to deal with in respect to the regulations of the level of the Lake of the Woods is a very difficult and a very important one. It affects very large interests on both sides and in both countries, and we sincerely appreciate the very kind effort which has been made by you gentlemen here to assist us, as far as you can, to reach a fair and just conclusion in regard to these facts, and we also want, on behalf of the commission, to express to the officers of Koochiching County our appreciation and thanks for the use of this court room during the past two days for the purpose of this hearing.

It has been a very great accommodation, and I do not know where we could have got a place in International Falls which would have been as comfortable and convenient as the court room of your county.

It is now 12 o'clock, midnight, and the committee will now adjourn.

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INTERNATIONAL JOINT COMMISSION,  
*Winnipeg, Canada, Tuesday, February 1, 1916.*

The International Joint Commission, pursuant to public notice, met at Winnipeg, Canada, on Tuesday, February 1, 1916, at 10 o'clock a. m., to hold additional public hearings on the question of the levels of the Lake of the Woods.

Present: Charles A. Magrath, Obadiah Gardner, Henry A. Powell, James A. Tawney, P. B. Mignault, R. B. Glenn; Lawrence J. Burpee, secretary of the Canadian section; and Scott F. Kittredge, acting secretary of the United States section.

Also Arthur V. White, of Toronto, and Adolph F. Meyer, of Minneapolis, consulting engineers to the commission.

Mr. MAGRATH (chairman). Gentlemen, the commission will now resume the hearing of what is generally known as the Lake of the Woods reference, which is a reference to the commission by both Governments to determine the most efficient use of the waters of the Lake of the Woods and of the waters flowing into and from that lake on each side of the boundary for domestic and sanitary purposes, for navigation and transportation purposes, and for fishing purposes, and for power and irrigation purposes, having due regard to agricultural interests adjoining the lake. The commission is also to determine the value of lands that may be flooded through the establishment of levels recommended by it.

We will first hear from our own engineers, as there are some statements that they would like to make bearing upon this matter. This meeting, gentlemen, as you know, was called largely for the purpose of permitting those interested in power to be heard, and a notice to that effect was sent out to the different interests in both countries. Before calling upon our consulting engineers we will appreciate it if those present wishing to be heard will announce their names and state whom they represent.

The following appearances were entered:

Edward Anderson, K. C., Winnipeg, Canada, representing the Dominion of Canada.

Frank H. Keefer, K. C., Port Arthur, Ontario, representing the Province of Ontario, and also the Dominion of Canada.

Manton M. Wyvell, Washington, D. C., representing the Government of the United States.

George W. Koonce, Washington, D. C., representing the War Department of the United States.

Col. Mason M. Patrick, Corps of Engineers, United States Army.

Maj. E. D. Peek, Corps of Engineers, United States Army.

W. J. Stewart, Ottawa, Canada, chief hydrographer for the Dominion of Canada.

J. B. Challies, Ottawa, Canada, superintendent of water power for the Dominion of Canada.

H. G. Acres, Toronto, Canada, representing the hydroelectric power commission of Ontario.

S. S. Scovil, Kenora, Canada, representing the department of external affairs of the Dominion of Canada.

Isaac Campbell, K. C., Winnipeg, Canada, representing the city of Winnipeg.

D. H. Laird, Winnipeg, Canada, representing the Winnipeg Electric Railway Co.; the Winnipeg River Power Co.; and two subsidiary companies operating street car lines in the suburbs, the Suburban Rapid Transit Co., and the Winnipeg, Selkirk & Lake Winnipeg Railway Co.

C. J. Rockwood, Minneapolis, Minn., representing the Rainy River Improvement Co., the Minnesota & Ontario Power Co., the Keewatin Lumber Co., and the Keewatin Power Co.

Clifford L. Hilton, St. Paul, Minn., assistant attorney general, State of Minnesota, representing the State of Minnesota.

Hon. Paul Marschalk, Warroad, Minn., representing the navigation and fishing interests.

C. E. Berkman, Chisholm, Minn., representing the interests in the sixth congressional district of Minnesota.

E. L. Taylor, Winnipeg, Canada, representing property owners on the Lake of the Woods.

C. P. Wilson, Winnipeg, Canada, representing the Lake of the Woods Milling Co.

W. W. Richardson, Winnipeg, Canada, representing owners of summer homes on the Winnipeg River, below Kenora.

W. W. Evans, representing the Canadian Northern Railway.

Mr. MAGRATH. Gentlemen, we will now call upon Mr. White, one of our consulting engineers, for a statement, and he will be followed by the other consulting engineer, Mr. Meyer.

**STATEMENT OF MR. ARTHUR V. WHITE, OF TORONTO, CANADA,  
CONSULTING ENGINEER OF THE INTERNATIONAL JOINT  
COMMISSION.**

Mr. WHITE. Mr. Chairman and gentlemen, in opening our presentation we will first make a brief historical reference to certain matters related to power interests dependent upon the use of the Lake



of the Woods waters, and of the waters flowing into and out of the lake.

As is known, there is a narrow, rocky ledge separating the Lake of the Woods from the Winnipeg River. There are also two large natural outlets to the Lake of the Woods, one known as the eastern outlet and the other as the western outlet. There is a power development—the municipal plant of the town of Kenora—existent in the eastern outlet. There is a dam, known as the Norman Dam, which also constitutes a power site in the western outlet. There are two prominent commercial power developments that have been created by cutting through the rocky ledge. These developments are known as mills A and C of the Lake of the Woods Milling Co. At the end of Portage Bay, on the lake level, which runs along this rocky ledge, there was formerly a power development, known as the Keewatin Lumber & Manufacturing Co.'s site.

So far as we have been able to ascertain, the outlets remained in a natural condition until 1879. In that year a headrace, partially in earth and rock excavation, was constructed at the extreme westerly end of Portage Bay, Keewatin. In 1885 the intake was deepened. The plant which was erected on this site has been closed down since 1906. In 1881 the rocky ledge was cut through to provide a raceway subsequently utilized for mill C; and in 1887 another rock cut was made, to provide a raceway for mill A. On account of low water experienced in the early eighties on the Lake of the Woods, a submerged dam, referred to as the Rollerway Dam, was constructed in 1887-88.

In 1895 an agent of the General Land Office at Washington, Mr. A. F. Naff, was sent to investigate alleged flooding due to the construction of this submerged dam. In 1899, according to testimony of Mr. Naff, the top part of the Rollerway Dam had been washed away.

In 1892 the Citizens' Telephone & Electric Co. constructed a diversion canal on the eastern outlet. This diversion canal, however, so far as we have been able to ascertain, did not affect the natural discharge of this eastern outlet.

Between 1893 and 1895 the Norman Dam was constructed in the western outlet, but it was not until 1898 that stop logs, for purposes of control, were inserted in this structure.

Mr. POWELL. What do you mean by the statement that it did not affect the natural discharge? Do you mean that as incidental to the work there was nothing done?

Mr. WHITE. The excavation was made out of the side or bank, and it did not, I believe, encroach upon the original channel.

In 1900 recommendations were made for the establishment of a harbor at Warroad. In 1905 the United States Secretary of War wrote to the United States Secretary of State requesting that an arrangement with Canadian authorities be entered into to provide for a minimum of what was termed 7.2 on the Warroad gauge. This recommendation eventually reached the Department of Public Works of the Province of Ontario, and they subsequently recommended and made provision to maintain a general, rather than a minimum, stage of about 7.2.

Mr. KEEFER. What would 7.2 be on this gauge referred to?

Mr. WHITE. On the sea-level datum which we are using 7.2 would be 1,060.8.

In 1905 further protests of alleged flooding were made from settlers along the southerly shore, to the United States Federal Government, and these protests resulted in investigations being made by the United States War Department, chiefly through their district engineer's office at St. Paul. The investigation continued until about 1911. In 1912 the district engineer at St. Paul recommended that the matters which had been referred to him be submitted for investigation to the International Joint Commission. This was subsequently done.

In September, 1912, the commission, as you are aware, held preliminary hearings at International Falls, Warroad, and Kenora, with the object of ascertaining what course could most intelligently be pursued in order satisfactorily to investigate the matters brought to their attention. It was decided that it would be necessary to make detailed surveys of lands bordering the lakes, the levels of which had been affected by such structures and alterations as I have just referred to. These surveys have been made, covering a total area of some 139 square miles, actually contoured, of which 107.5 square miles represent actual land areas; the remainder, 31.5 square miles, being represented either by water or by more or less submerged areas. The northerly shore of the Lake of the Woods was reconnoissanced; surveys were made on Rainy Lake, and also on the lakes above Kettle Falls. The classification of the different areas of land, with descriptions of same, respectively, are fully set forth in the text of our report, running from pages 17 to 57.

Having the present hearing more prominently in mind, the areas between 1058 and 1064 contours have been separately tabulated in our report. Briefly stated, between these contours there is a total of 63,066 acres, of which 24,150 are in the United States and 38,916 in Canada. The land actually under cultivation within these contours is 341.9 acres, of which 66.8 acres are in Canada and 275.1 acres in the United States. Further details are as follows:

	Canada.	United States.	Total.
	<i>Acres.</i>	<i>Acres.</i>	<i>Acres.</i>
Cultivated land.....	66.8	275.1	341.9
Grass land.....	746.7	1,012.9	1,759.6
Grass land with scattered poplar.....	127.4	645.0	772.4
Deciduous trees.....	3,560.3	4,800.2	8,360.5
Mixed deciduous and coniferous.....	2,165.5	404.8	2,570.3
Coniferous swamp.....	8,523.3	5,427.2	13,950.5
Willows and brush.....	5,135.6	3,724.2	8,859.8
Open marsh or bog.....	16,319.2	6,651.2	22,970.4
Sand.....	250.7	273.4	524.1
Water.....	1,990.9	924.1	2,915.0
Rock.....	29.5	7.0	36.5
Grand total.....	38,915.9	24,150.1	63,066.0

In addition to these surveys, it was necessary to obtain all available hydrographic records. These were secured for the watershed, and investigations were carried on in order to obtain a correlation of the various gauges and datums in use by governmental, corporate, or private agencies prosecuting engineering work on the Lake of the Woods watershed. The results of this correlation are summarized on page 106 of text of the report and its accompanying plate.



Physical evidences, such as watermarks, indicating lake stages, have been carefully investigated, and our report sets forth the conclusions relating to this subject. (See text of report, p. 164, et seq., and p. 170 et seq.)

In passing, it may be pointed out that in the watermark observed on the rocky shores of the Lake of the Woods, corresponding in general elevation to what is known as the Kennedy high-water marks, there is really evidence of an extreme stage occurring doubtless in a state of nature, probably at long intervals. It is not a stage indicating levels or stages ordinarily recurrent.

Having analyzed and familiarized ourselves with the assembled hydrographic data, it was possible intelligently to derive certain mean lines for the stages of the Lake of the Woods throughout a period of about 21 years. Careful surveys of the outlets of the Lake of the Woods in combination with other existing data, have enabled us to estimate what levels would have prevailed on the lake had the outlets remained in a state of nature. We also know within good limits what the inflow into the Lake of the Woods has been; and we have been able to deduce what the inflow into the lake would have been under various supposed systems of regulation or control, had such been maintained over the period for which we have available records.

We find, for example, that during the past 21 years the Lake of the Woods has been maintained at an average elevation practically 3 feet above what the average computed level would have been under natural conditions.

On page 169 of text of report we set forth what the prevailing levels would have been during the growing seasons of this period of 21 years, the object in so doing being that naturally the growing season is of more importance to the agricultural interests. It will appear from the data on this page 169 that a level of 1,059 or above would, under natural conditions, have prevailed between 20 and 25 per cent of the time.

A table of summaries of monthly mean levels of the Lake of the Woods from 1893 to 1914, also a summary of annual range of levels and of outflows, appear on pages 185, 186, and 187.

It will be noted from the curve on plate 125 that the level of the Lake of the Woods during this 21-year period was for 50 per cent of the time above stage 1,059.85, and that the corresponding level, which, according to our computations, would have prevailed if no control of the outflow from the Lake of the Woods had been exercised, is 1,056.75, a difference of 3.10 feet. The average controlled level during the period under discussion is 1,059.66, and the average computed natural level is 1,056.81, a difference of 2.85 feet.

The curves of plate 125 show, further, that the extreme high actual mean monthly level for the period of years 1892 to 1913 is 1,062.27, as contrasted with the computed high natural mean monthly level of 1,061.02, a difference of 1.25 feet. The lowest actual mean monthly level between 1893 and 1913 is 1,056.64, whereas the lowest computed natural level is 1,052.95, a difference of 3.69 feet.

For 10 per cent of the time, in the state of nature, the lake rose above a stage of 1,059.2, and for 5 per cent of the time the stage was above 1,059.95, or practically above 1,060.

In the portion of our report where we are referring to these facts we draw attention to a conclusion which we think may fairly be urged, namely, that a stage of 1,059, or thereabouts, may be regarded as "ordinary high-water mark" within the meaning which attaches to the phrase, as employed in the United States Federal statute applying to certain Federal rights in navigable waters.

In order, graphically, to summarize the data and computations relating to the level of the Lake of the Woods, what we term frequency curves, showing actual controlled levels and outflow, and also computed natural levels and outflow, have been prepared (see pl. 125). Either from actual records or by deduction from pertinent data, we have deduced the inflow into Rainy Lake from 1892 to 1914—the period covered by our report. This inflow passing into and discharging from Rainy Lake has been assumed to be regulated according to certain methods of control, and then combined with the run-off from the watershed tributary to the Lake of the Woods below International Falls. By such means we obtain the inflow into the Lake of the Woods, and to these quantities, according to various systems which we presuppose, we ascertain what the outflow from the Lake of the Woods would be under these assumed systems of control.

Now, knowing what the outflow from the Lake of the Woods would be, and also the inflow into the lake, there may be derived what the levels of the Lake of the Woods would have been under any presupposed system or systems of control for the period from 1892 to 1914. The processes of derivation are fully set forth in our report.

Before passing to an explanation of what we term methods of regulation A and B the consulting engineers would like to say that all physical data which are germane to the considerations which have just been mentioned, have been before interested parties, in the form of our report to the commission, for nearly three months. Much of these data were obtained from the various interests here represented and are well within their knowledge. We have subjected these data to careful analysis. The results of these various analyses are set forth in our report. We have stated, for example, what we believe to have been the mean lake levels, mean tail-water levels, and the discharges from the lakes according to the available records: we have computed and set forth the mean line of computed natural lake levels, and deduced the outflow under natural conditions. In short, we have published the basic data both actual and computed.

Disassociating now these data from any special conclusions or considerations based thereupon, as, for example, the applicability of our methods of regulation A or B—I say, disassociating these from such basic data as I have just mentioned—the consulting engineers and, I believe, the commission also, would be pleased to learn whether or not we—the various interests and ourselves—are all on common ground with respect to these basic physical data. If it seems fitting at the present time, an expression on the part of interests here represented might be given as to whether or not with regard to the data incorporated in our report, we are all in essential agreement and, so to speak, are all able to express ourselves in the same language before this commission.

Mr. ANDERSON. Mr. Chairman, so far as any interests that I represent are concerned, we accept as correct the physical data as ascertained by the engineers of the commission, and at this stage I would



like to compliment the engineers of the commission on the energy, the ability, and the patience which they have exerted in compiling a very vast mass of information that was, to a large extent, very difficult to get. I think that they are entitled to that commendation as far as I am concerned.

MR. POWELL. Your approval extends then to the total series of tables that are published in the report?

MR. ANDERSON. We do not take any issue with any of the physical facts which they have ascertained and state to be correct.

MR. POWELL. And included in these reports?

MR. ANDERSON. I assume that, of course.

MR. BERKMAN. Mr. Chairman, we do not take any issue with the data as they have compiled it, but we do differ on some of the conclusions of the engineers, and we will after a time develop that with the engineers themselves.

MR. MAGRATH. You are satisfied with the data they have produced?

MR. BERKMAN. Yes; so far as the data have been worked out we are satisfied.

MR. TAWNEY. Mr. Anderson, do we understand from you that you agree with the report of the consulting engineers as to the prevailing natural level, as to the actual level that prevailed and the natural discharge at the mouth of the lake, and also the actual discharge as found in their report?

MR. ANDERSON. As I understand it, we do not dispute any of those at all, Mr. Tawney. We take them as correct.

MR. MIGNAULT. I would like to know for my information if any interests here dissent from the statement which has been made by Mr. White as to the physical data which are contained in the report of the consulting engineers?

MR. WYVELL. Mr. Chairman, I think a great deal of very valuable data have been compiled here. As far as the interests which I represent go, I may say that we do not dissent in any way from the data which has been produced. By that I do not mean to assert—not being an engineer—that all of the conclusions drawn are correct, but so far as the data which have been used are concerned we believe them to be as correct as any human mind could possibly make them correct, by reason of the fact that some data which are available ought to be disregarded and some used. I think the engineers used very good judgment in disregarding the data which they say were disregarded, etc., and I have no doubt that the facts with reference to the outflow and the actual levels are correct. But may I be permitted to say that I do not want at this time to state, not being an engineer and not having any engineers with whom to consult, although the engineers of the War Department have carefully read the report, that all of the conclusions drawn would be followed by the engineers.

MR. ANDERSON. Mr. Chairman, I am instructed to say that so far as the run-off from rainfall at Rainy Lake is concerned, while we do not attach the same weight to it as the engineers do, we accept it as the best evidence of what actually occurs. It is simply a matter of conclusion, that is all. We differ as to their conclusions there and the weight to be given to them.

Mr. BERKMAN. We will concur in that.

Mr. WHITE. The portion of the Lake of the Woods watershed above International Falls and Fort Frances is the chief source of supply for run-off into the Lake of the Woods as represented by the statement that 54.2 per cent of the total drainage area of the Lake of the Woods lies above International Falls and contributes about 60 per cent of the total run-off. On the Upper Rainy watershed at the present time there is available as a result of works actually constructed some 70 billion cubic feet of storage on Rainy Lake, assuming 7 feet of draft, and some 30 billion cubic feet of storage above Kettle Falls, assuming 11 feet of draft. A storage of 150 billion cubic feet could probably be obtained either by increasing the storage on Rainy Lake and above Kettle Falls or by requisitioning such storage as may be provided on lakes Vermilion, Birch, Manitou, Otukamamoan, White Otter, La Croix, Basswood, and Saganaga.

Mr. POWELL. Before you go any further, Mr. White, there has been a little uncertainty as to just exactly the meaning of your statement. You are referring now to the potential storage, are you not, in your conclusion of 70 billion cubic feet?

Mr. WHITE. Yes; it is potential. It may be provided by the works.

Mr. POWELL. As a matter of fact has the level assumed in this potential ever been reached at International Falls?

Mr. WHITE. Yes; it could fairly be stated that it has been reached.

Mr. POWELL. In flood time or as a matter of storage?

Mr. WHITE. Well, as a matter of utilizing the flood waters and as a matter of definite design that it should be used.

Mr. POWELL. But I am asking you what has been the case.

Mr. WHITE. It has been so used; that is my understanding.

Mr. POWELL. Used generally?

Mr. WHITE. No, sir; more within the last year. In the space of years under consideration, 1892 to 1914, the extreme low-water period extends from July, 1910, to July, 1913, when considering 100 billion cubic feet of storage, and from July, 1910, to about the present date for 150 billion cubic feet of storage.

In our study we have assumed tentatively two alternative methods of regulation, which the report designates as method A and method B.

Now, before proceeding I wish to say that I believe there is no doubt these hearings will fail in being fully profitable if there is not possessed by those present a clear understanding of what these methods A and B are. Only within the last two or three days I have been asked a number of times, even by those who have had our report and who have read it, if I would just explain what these methods A and B actually are. It seems very desirable that these methods and the underlying principles which are involved in them, as well as their applicability, should be most clearly set forth. To this end, with your indulgence, I will offer a homely simile.

Let us suppose that on the Lake of the Woods watershed we have three commercial banking institutions, one at Kettle Falls, one at Rainy Lake, and one on the Lake of the Woods. Suppose further that we have a central bank located anywhere you choose, either on the watershed or off, it makes no difference. This central bank is able, we shall suppose, to dictate the policy and conditions which,



respectively, shall prevail at these other institutions. The central bank, for example, says that the bank at Rainy Lake shall never have within its vaults more than a certain definite reserve. Once this reserve reaches its maximum the bank must turn its surplus funds back to a depository maintained by the central bank. Within certain definite confines the Rainy Lake bank may liberate and otherwise deal with its funds as it pleases. All these banks, we will further assume, have been in operation for a long period of years. Persons still connected with the management of the institutions have experience gained over various periods. The banks are about to consider new policies for operation.

I think that some of the difficulty that has been experienced in readily following our methods A and B arises chiefly from the lack of familiarity with some of the engineering terms and expressions used. The banking institutions, as will later be seen, are supposed to represent the reservoirs, the means of controlling the outlets, and also the inflows and outflows; in other words, the whole system of affairs connected with the respective reservoirs and their operations. The central depository may be regarded as analogous to Lake Winnipeg or some other reservoir removed from present considerations. Now, the Rainy Lake management are confronted with a restriction imposed by the central bank that the funds must not accumulate beyond a certain amount, and that when this amount is reached the surplus must be discharged or transmitted to the central depository.

Director No. 1, of the Rainy Lake bank, volunteers the assertion that he anticipates no trouble in conforming to the imposed stipulations. He has had 10 years of experience, and states that as a result he is "qualified to predict just what the course of events may be and also how they may satisfactorily be coped with."

Director No. 2, who has been in the employ of the bank for a much longer period, queries:

Were you through the depression of 1873 to 1878? Do you know what a serious five-year depression period we pulled through at that time? You can not predict upon your 10-year knowledge of the resources and outgo in a manner that will enable us to outline the best policy for this local institution to adopt—having in mind a successful policy suitable also for a long term of years.

This director adds:

I think the wisest policy for us to adopt is to appraise our assets and see how they may be handled so as to yield us the largest amount of money which we may uniformly supply from the bank throughout a definite period of lean years, such, for example, as the five-year depression between 1873 and 1878.

Director No. 1 replies:

Well, I do not think that we need figure on these extreme circumstances, which, as you point out, but rarely occur. Granting that we have had bad periods of depression, I am familiar with the one in 1907 projecting itself more or less forward into the exceptional depression accompanying the outbreak of the war, but I do not think we need to have the rate of outgo of our funds governed chiefly by these depression periods.

I do not agree with such policy. We are getting in certain moneys which we can reasonably disburse, and I think we ought to let the money which we receive go out uniformly in as large an amount as possible every year, without much regard to what occurs during the exceptionally lean years.

**Director No. 2 says:**

Well, if your policy is adopted we are going to get caught with a very low reserve in the bank, and if there are then heavy borrowing demands on the institution, what are we to do under such circumstances?

**Director No. 1 says:**

We will go out on the open market and borrow whatever is necessary to supplement our own resources.

**Director No. 2 replies:**

If you do we will have to pay an exceptionally high rate of interest.

**Director No. 1 states:**

I do not care specially about that, because I believe that we can make enough money in the interim—in the years of good turnover—by the employment of the largest reasonable amount of our funds every year, to enable us not only to pay this excess rate, but also to have a handsome profit.

**Now, again, director No. 3 suggests:**

Would it not be possible for us to let out, annually, more than this reasonably large amount which you refer to?

"Yes," says director No. 1, "there is the possibility of doing that, but the trouble is that the times at which we may have the surplus available are so uncertain and can not be foretold that I am afraid we will experience difficulty in obtaining a customer for it. Naturally, a customer, in order to enter into a business to use such funds would require to make certain outlays, and unless we could give him some assurance that we could supply him with funds from our reserves, I am afraid the proposition would present more difficulties than benefit. On the whole it may be better not to attempt to use the uncertain surplus—better to waste it. We must run our institution quite apart from benefit or otherwise from so uncertain a factor as this occasional surplus."

Now, I have just one other element to introduce and will then apply the illustration. Suppose that a director anticipates that there must, of necessity, at some time be exceptionally large receipts flowing into the bank, although the times when such may occur may not be precisely foretold. There may, however, be certain premonitory evidences that the approach of such a period may be at hand, thus affording some warning, and indicating a necessity to prepare for it. This director says:

There is a difficulty which I foresee in carrying out the policy of having our rate of outgo of funds as large as possible over periods of say three to five years of financial depression. As you know, we are required by the central bank to discharge to the depository all surplus beyond a prescribed working maximum. As you know, we have at present only certain means of sending back the surplus: through other banking institutions, by express, through the post office, etc. Our means for conveying the surplus are limited. If we have to provide additional means beyond a certain amount, the charges against us are going to be abnormally high.

When, for instance, the farmers are getting large returns, and coincident therewith there is a shortage of paper, we will say in the east, necessitating the mills running night and day, and bringing, in turn, high wages to the milling community, all resulting in exceptionally large inflow of bank receipts, do you not think we could confer with the central institution, and, under such circumstances as have just been mentioned, secure permission from them to permit us to store, for a short time, some of the extra receipts in our own institution. We could then begin, immediately, sending back larger sums, and, doubtless, in the course of two or three or four months, we would have brought the temporarily large surplus at our bank down to the prescribed limits. I think, if we could secure permission to use our institution\*once in, say, 20 or 25 years, or even oftener, in the manner suggested, it would work no serious hardship; and, indeed, such hardship as might be entailed on anyone could be compensated for. It would avoid our providing extensive supplementary



avenues for transmission of the surplus, and not leave us apprehensive respecting the effect which these exceptional times or influx of funds might have upon our operations.

Is it not, therefore, conceded that it would be a good suggestion to provide for some excess or surplus storage to accommodate especially large inflow?

Now, briefly, to connect these matters up, beginning first with the last part of our illustration: The waters of the Lake of the Woods watershed have, eventually, to leave the watershed via the outlets from the Lake of the Woods in the vicinity of Kenora. If it is decided that the level of the lake shall never rise above a certain prescribed stage, then you will have to provide an avenue, or avenues, sufficiently large to enable the water to get out, or else you will have to permit as much of the water as possible to escape through the discharge avenues, and then, also, permit the balance of the surplus water to go temporarily into storage. This is nature's method of disposing of her waters during periods of exceptional run-off. To provide additional discharge capacity will be expensive; it is in rock, and the more the excavation, the greater the expense.

Obviously, if the bank at Rainy River is holding over, from year to year, funds with the object of having same available to meet a period of low depression, then when the period of exceptional receipts arrives, naturally the surplus in the bank will be larger than would be the case if the funds were drawn down to a lower reserve—as would be the case under our supposed method B.

In a word, now—and you may supply the details of application—our proposed method A is analogous to the assets of the bank being so handled that when the period of long depression arrives the assets may maintain a rate of outflow of funds as great as possible throughout this entire depression period.

Method B, on the other hand, provides that as large an amount of money as is considered reasonably safe is permitted to go out annually, largely regardless of how small may be the reserves during the low extremes of the period of depression. The suggestion that the low rate of outgo prevailing over the period of marked depression under this method could be augmented by securing funds at a higher rate of interest on the open market is analogous to the providing, under method B, of an auxiliary steam plant, thereby furnishing the power from steam. It is true, the cost of power from steam is usually more than the cost from water, but, on the other hand, the utilizing of the maximum advantageous amount of power every year, under method B, would, it is suggested, not only meet the extra cost of the auxiliary steam power but, in addition, leave a balance in favor of method B. And, further, just as great financial depressions are not infrequently heralded by premonitory signs; similarly the approach of the periods of deficient run-off may, correspondingly, be discerned by those who are interested in the 'signs of such times.'

It is not necessary to pursue the illustration; but it may be well just to remark that the bank at Kettle Falls is a local institution collecting funds and liberating them largely in the interests of the larger institutions at Rainy Lake and Lake of the Woods.

The management of the bank at the Lake of the Woods may say "we can probably arrange with the Rainy Lake bank to let funds reach us in a certain way. We are deriving certain funds from our

own local sources. It is our hope that these may be combined in a manner that will enable us to keep within our prescribed reserves, and at the same time permit us to serve all our customers to the best advantage, and also have our outflow of funds."

Thus, in our report we tentatively suggest the combination of certain methods of storage and control on Rainy Lake, considered with respect to certain corresponding or other combinations on the Lake of the Woods. The suggestions in our report do not constitute all the combinations that might be effected. We have combined A on Rainy with 100 billion cubic feet of storage on Upper Rainy reservoirs with A on the Lake of the Woods. We have combined A on Rainy with 150 billion cubic feet of storage on Upper Rainy reservoirs with A on the Lake of the Woods.

We have combined B on Rainy with 100 billion cubic feet of storage on Upper Rainy reservoirs with B on the Lake of the Woods; and correspondingly with 150 billion cubic feet of storage with B on each lake.

At the Detroit meeting of the commission we outlined other combinations and we promised that, so far as possible, we would have these advanced for presentation at this meeting. We might, for instance, combine A on the Lake of the Woods with B on Rainy. These studies were only partially completed.

MR. CAMPBELL. Have you worked out A on the Lake of the Woods with B on the upper lake?

MR. WHITE. Yes, sir; that constitutes one of our studies. We have also made other tentative comparisons. The studies presented in our report are based chiefly on the supposition of a full utilization of all the water powers, and our report is only, as you will notice, to the commission; and, further, on page 4 of the report you will observe we state to the commission that "we desire, later, to supplement this report with such further data and to direct your attention to such additional engineering considerations as the representations of interested parties expressed at subsequent public hearings may merit."

MR. ANDERSON. Mr. White, have you got any of those other alternative suggested methods ready for publication?

MR. WHITE. After I get through with my present remarks and in a short time here, at this meeting, Mr. Meyer will present some supplementary considerations.

MR. MIGNAULT. Mr. White, does it not all come down to this: Method A means greater storage and less discharge, and method B means less storage and greater discharge?

MR. WHITE. Well, that is expressed succinctly. That might convey the meaning. Of course, the same amount of storage is provided or presupposed as existent in each case.

MR. MIGNAULT. Yes; I understand that; but the object of method A is chiefly to provide greater storage. The object of method B is to produce greater results year after year and, consequently, there would naturally be a greater discharge and less storage—less laying aside for future years?

MR. WHITE. Yes; that is correct—less holding in reserve for a protracted low period under method B than under method A.

MR. KEEFER. You put these forward as tentative suggestions. Have the consulting engineers come to any conclusion?



Mr. WHITE. The consulting engineers are only presenting tentative considerations, and both the commission and the engineers have refrained from making definite conclusions until they hear the power interests.

Mr. KEEFER. What I meant was in any advisory capacity.

Mr. WHITE. No; we are still holding ourselves open until we hear the power interests.

Mr. KEEFER. You will draw your conclusions then?

Mr. WHITE. After we have heard the interests that are represented here.

Mr. POWELL. Using your simile of the banks, to boil down the situation it is this: That a certain number of people or communities, whom we will call the power interests, are desirous of a certain line of credit. The idea is to give them this line of credit and in order to do so you marshal the assets of your central bank. That is what it means?

Mr. WHITE. Yes, sir; viewed from certain standpoints.

Mr. POWELL. Now, leaving your simile and coming to the situation before us, what you are contemplating by these different methods is to make as uniform as possible the flow of the water at the northern end of the lake? That is the objective point?

Mr. WHITE. That would be the objective point under full development.

Mr. POWELL. Yes; and your different methods are methods of assembling those results in view of the effect on other interests?

Mr. WHITE. That is true, and one method gives certain desirable features and another method certain other features.

Mr. POWELL. Certainly, and each one may have its drawback, and the question before us is to select the scheme that would work the least evil and accomplish the most good.

Mr. WHITE. Certainly. I would just like to repeat that if you were all as familiar as I have been with the number of times, and, as I said, even recently, that persons have said, "We have the report but we do not understand your methods A or B; we have not got the thing clearly in our minds," you would have appreciated why I felt it necessary to devise some means of making these technical considerations more clear.

Mr. POWELL. If they wanted many favors from the bank maybe they would have understood your method.

Mr. WHITE. Of course, the simile is not on all fours, but I trust it may, to some at least, have been serviceable.

Mr. KEEFER. Is it necessary to consider either of these methods prior to getting your development up to its full capacity? In the present state of affairs can the methods be eliminated and consideration given simply to storage?

Mr. WHITE. We feel that the power interests knowing what their possible markets are, what their plants are or are likely to be, will have considered such matters and will be able to present their views. That is what the commission is meeting here for.

Having now in mind the illustrations just offered, we may proceed to methods A and B as described with more technical verbiage in the report.

Briefly stated, under method A it is proposed to limit the outflow, whenever the reservoir is being drawn upon, to the highest possible rate which, by the judicious use of the storage, can be maintained during the extreme low-water period extending over a few years. Under this method effort is made to fill the reservoir every spring on the assumption that it can not be foretold whether the succeeding summer, or, indeed, the succeeding years, may or may not be the approach of the exceptionally dry period over which it is intended to equalize the flow, and to do which would require at the beginning of the period a full reservoir. Whenever the reservoirs are full and the water is being wasted, a higher rate of discharge than the selected rate may, of course, be economically employed.

Under method B the aim in general is to supplement to the greatest possible extent the ordinarily recurrent or yearly low-water flow and to utilize the largest possible portion of the available run-off from the tributary watershed, insuring that this run-off maintains for much the larger portion of the time a high uniform rate of outflow. For example, on Rainy Lake, in our studies of method B, effort is made to maintain and to utilize, as far as possible, a minimum outflow of 10,000 cubic feet per second.

What are technically termed "mass curves" representing the data used in connection with these studies on Rainy Lake are given on plates 127 and 128. The shaded areas on the graphs indicate the amount of water wasted. It is evident that method A wastes more water than method B. On the other hand, method A, with 100,000,000,000 cubic feet in the Upper Rainy reservoirs, would give a uniform flow of 5,835 cubic feet per second from July, 1910, to about July, 1913. Method B, with a flow of 10,000 cubic feet per second, maintained as far as possible into the dry period, would have given a low-water flow from July, 1910, to April, 1911, of only about 3,500 cubic feet per second. It will be observed, in general, that method B seeks to use as much of the water as possible every year, while method A, if it may be so stated, cautiously withholds water every year, not knowing but what it may be required in order to maintain as high a rate as possible during the extended low period which may prevail for perhaps a few years. The times of the occurrence of greatest depletion of storage on the Lake of the Woods under various methods of regulation are as follows:

Method.	Storage on Upper Rainy.	Feet draft on Lake of the Woods.	Date of great- est depletion of storage.
	<i>Billion cu- bic feet.</i>		
A.....	100	5	Apr. 1, 1912
A.....	100	6	Apr. 1, 1914
A.....	100	7	Do.
A.....	150	5	Do.
A.....	150	6	Do.
A.....	150	7	Do.
B.....	100	5	Apr. 1, 1912
B.....	100	7	Do.
B.....	150	5	Do.
B.....	150	7	Do.
A on Lake of the Woods.....	100 and 150	5	Do.
B on Upper Rainy.....			



Certain results which follow from these two methods of regulation may briefly be summarized as follows:

1. From the standpoint of the power interests at International Falls and Fort Frances, method of regulation B would have resulted in an average of 1,968 more horsepower being available than under method A.

2. An aggregate storage capacity of 100,000,000,000 cubic feet is all that need be provided on the Upper Rainy watershed if these reservoirs are to be regulated according to method of regulation B.

3. Under method of regulation A, with 100,000,000,000 cubic feet of available storage capacity on Rainy Lake and the lakes above Kettle Falls, Rainy Lake would have been full more than 85 per cent of the time, whereas under method of regulation B it would have been full only about 40 per cent of the time. These facts may be seen by referring to the frequency curves, Plate 131.

4. From the viewpoint of damage to riparian owners on Rainy Lake, method of regulation B would have been more advantageous because the average level of the lake would have been about 2 feet lower and the high level would have prevailed only half as long.

5. The following rates of outflow would have prevailed:

	Minimum outflow.	Maximum outflow.	Average utilizable outflow.
<i>Under method A.</i>	<i>Cubic feet per second.</i>	<i>Cubic feet per second.</i>	<i>Cubic feet per second.</i>
With 100 billion cubic feet storage.....	5,835	31,241	7,614
With 150 billion cubic feet storage.....	6,710	28,237	7,883
<i>Under method B.</i>			
With 100 billion cubic feet storage.....	3,500	27,651	9,029
With 150 billion cubic feet storage.....	4,230	27,651	9,276

6. Under method B, throughout all seasons but one in 22 years, a greater ordinary flow would have been available between May 1 and October 1, for navigation on the Rainy River below the International Falls-Fort Frances Dam than under method A. After July 1, during that one year, the flow would have fallen to about 3,500 cubic feet per second, which is less than is required for satisfactory navigation of the river.

7. For about nine months during the extreme low-water period, 4,000 less horse power would have been available under method B than under method A; that is to say, if continuous power is needed, the capacity of the auxiliary power plant under method B would require to be 4,000 horsepower larger than under method A.

Reverting for just a moment to our illustration: I drew attention to the fact that when the bank's reserves would run unusually low under the larger yearly letting out of funds, that then supplementary assets might elsewhere be secured in order satisfactorily to continue the business of the bank. The application of the illustration is that if the power companies are caught unduly short of water, they could supplement the power by providing an auxiliary steam plant.

Mr. BERKMAN. Mr. White, if they are caught short of water, then they will be more like a farmer that is caught short of rain; they

will not have anything coming in that year; but in order to be able to operate the next year it is not necessary that they suspend, as a bank would have to do in case they could not get funds.

Mr. WHITE. You mean the farmer?

Mr. BERKMAN. Well, the farmer will have to get over to the next year, and these power interests at International Falls would simply have to shut down their plant. They would not be like a bank, which, if it did not have the funds, would have to suspend.

Mr. WHITE. Mr. Berkman, you may extend your illustration in this way: The farmer might have more than one year of absence of rain and have to carry over. Now, the power interests at International Falls and Fort Frances may, just like a financial institution, say, "We do not like the signs of the times in the East; it looks as if we are going to have a tight squeeze here later, and we had better get out and borrow some money before everybody else is after it." Similarly, the power interests at International Falls would say, "We do not like these precipitation records; snowfall is light and the streams have been dropping like they did in the low-water season of 20 years ago; we had better get busy and get in an auxiliary plant now."

Mr. BERKMAN. In the case of the bank if they did not have the funds they would have to suspend and liquidate, whereas if the plant at International Falls had to stop they would just stand dead that year, but they would not have to liquidate.

Mr. WHITE. It is like this: The bank says, "If we can not get some funds somewhere, we have got to liquidate." Somebody in the bank says, "Let's draw from Chicago. I think we can get a loan there which will tide us over." The power interests say, "Let's put in a good auxiliary plant. We will not have to shut down if we can install the plant in time."

Mr. BERKMAN. The bank has to liquidate and go out of business.

Mr. WHITE. So does the power company.

Mr. BERKMAN. No; they only go out of business that one year, but with the bank all its connections and its customers are lost through liquidation.

Mr. WHITE. As I suggested before, the illustration offered is not to be placed on all fours exactly; but the International Falls power people might say, "If we can not run for a year and a half or two years"—

Mr. POWELL (interrupting). I am afraid you will get into an interminable logomachy over the appropriateness of your figure. You had better confine yourself to your story.

Mr. WHITE. I was just going to say that the interests at International Falls might think it would be such a serious matter to shut down for a year or two that they would lose their business. How would that be, Mr. Backus?

Mr. BACKUS. That is true.

Mr. WHITE. We shall now consider the effect which the two methods of regulation, method A and method B, with 100 and 150 billion cubic feet under each method, will have upon the regulation of the levels and outflow from the Lake of the Woods. The run-off from the drainage area below Rainy Lake has alternatively been



combined with the regulated outflow from Rainy Lake resulting from—

Method A on Rainy Lake with 100 billion cubic feet of storage on Upper Rainy reservoirs.

Method A on Rainy Lake with 150 billion cubic feet of storage on Upper Rainy reservoirs.

Method B on Rainy Lake with 100 billion cubic feet of storage on Upper Rainy reservoirs.

Method B on Rainy Lake with 150 billion cubic feet of storage on Upper Rainy reservoirs.

The results of the studies as presented by our four mass curves of inflow into the Lake of the Woods are reproduced on plates 132 to 135. Plate 132, for example, shows the results obtained by applying method A on the Lake of the Woods combined with the outflow from Rainy Lake similarly regulated, using 100 billion cubic feet of total storage on the Upper Rainy reservoirs. The Lake of the Woods reservoir is considered under normal conditions to be filled every spring. The equalization of outflow which would have been effective over the dry period by means of various drafts of available storage on the Lake of the Woods itself has been determined.

In deciding upon the extent of draft which we would employ in the tentative studies we took 5 feet. The reason for doing this is explained on page 214 of the report. Any extent of draft could be assumed for any particular or specific study. Our representations are based upon the forms which the respective mass curves take consequent upon the past records.

Mr. KEEFER. To us untechnical people, Mr. White, would you explain if there is any distinction between draft and range and storage? You speak of 5 feet draft there and sometimes we speak of 5 feet range and 5 feet storage.

Mr. WHITE. If you had a range in levels of 5 feet between, say, 1,055 and 1,060, and had the level of the lake at 1,055 and allowed the lake then to fill up with 5 feet of water, you would have 5 feet of storage. If you then proceeded to draw this water off and lower it again to 1,055, you would have drawn the lake down through a range of 5 feet and would have made a draft on storage of 5 feet.

Mr. KEEFER. In that respect they are synonymous, are they?

Mr. WHITE. Synonymous as used with the technical significations I have endeavored to give by paraphrasing.

Mr. KEEFER. You would apply the word "range" to the same thing?

Mr. WHITE. A range of 5 feet could be a draft of 5 feet?

Mr. KEEFER. Is there a distinction between range and storage? I believe there is, but I do not know.

Mr. WHITE. Yes; there is a difference between range and storage. In the way we have used the expression "storage" we have in mind more the actual entity of the water which is confinable within this space provided to receive it and which space has a range of 5 feet, so to speak.

Mr. KEEFER. In these studies you have taken 5 feet more of range or storage.

Mr. WHITE. We would use the terms range or storage as seemed appropriate with respect to what we were discussing.

As just mentioned, you will notice in our report that some of our studies have been premised on a 5-foot draft on storage. We have assumed that at the beginning of each yearly period following the filling of the reservoir, the regulated outflow, in accordance with the principle of method A, is limited to the rate maintainable by a 5-foot draft on storage extending throughout this extreme low-water period which began in 1910. This rate of outflow is 10,390 and 11,050 cubic feet per second, respectively, for the 100 billion and 150 billion cubic feet of total storage capacity on the upper Rainy reservoirs.

I see the time is running on. The larger part of what it has been my intention to add to what has already been presented consists of summaries extracted from our report. The object in reviewing these data at the present time is to refresh the recollection of those present upon certain quantities which will frequently be under consideration at this meeting.

A brief reference will now just be made to certain features of methods A and B, and to the powers both at the outlets and on the Winnipeg River; and the fuller summary may be incorporated at this place in the report of the hearings for the perusal of those interested in the statements assembled.

If, some months after the beginning of the yearly low-water period, it is perceived that, owing to increase of inflow, the reservoir has again become filled so that water is being wasted, then the rate utilized may be increased. It has been concluded that the highest rate which thus could have been economically utilized for power development on the Winnipeg River during the wasting period, under method of regulation A, and with 5-foot draft on the Lake of the Woods, would be 13,000 cubic feet per second. Higher rates of flow than 13,000 cubic feet per second would have been available for such short periods of time that it is questionable whether it would have been advisable to have installed the additional machinery necessary for the utilization of a higher rate.

On plates 134 and 135 a study is presented setting forth the results which could have been obtained on the Lake of the Woods if both the Upper Rainy reservoirs and the Lake of the Woods itself had been regulated according to method B, and with both 100 and 150 billion cubic feet of total storage capacity available on the Upper Rainy watershed. Under these conditions of regulation it appears that it would have been feasible to utilize up to 16,000 cubic feet per second in power developments on the Winnipeg River. It has been assumed that this amount of water would be discharged from the lake at all times except when, on the basis of evidence furnished by existing storage on the Upper Rainy reservoirs, and by the winter and spring precipitation on the watershed, the setting in of a protracted dry period could clearly be foreseen.

By means of 100 billion cubic feet of available storage on the Upper Rainy reservoirs it would have been possible to have secured a minimum regulated outflow from the Lake of the Woods of 7,710 cubic feet per second on 5-foot draft, and 9,140 cubic feet per second on 7-foot draft. With 150 billion cubic feet of available storage it would have been possible to have increased the low-water flow to 8,570 cubic feet per second on 5-foot draft, and to 10,000 cubic feet per second on 7-foot draft on the Lake of the Woods.



Frequency curves of outflow, which furnish a means for ready comparisons of the rate of outflow maintainable from the Lake of the Woods under the different methods of regulations, have been prepared and are shown on plate 137.

The computations entering into the construction of these frequency curves show that:

1. Under method A a storage capacity of 150 billion cubic feet on the Upper Rainy reservoirs would have maintained, with a 5-foot draft on Lake of the Woods storage, an average utilizable rate of outflow which is 384 cubic feet per second, or 3.4 per cent, higher than that maintainable with a correspondingly used storage of 100 billion cubic feet.

2. Under method B 150 billion cubic feet storage on the Upper Rainy reservoirs would have maintained, with 5-foot draft on the Lake of the Woods storage, an average utilizable rate of outflow which is 87 cubic feet per second, or 0.6 per cent, higher than that maintainable with a correspondingly used storage of 100 billion cubic feet.

The quantities expressing the utilizable rates of outflow which could have been maintained over the years 1892 to 1914 are summarized on the following page:

*Summary of utilization outflow from Lake of the Woods.*

Method of regulation on both Upper Rainy and Lake of the Woods.		Total storage on Upper Rainy.	Utilizable rate of outflow.
		Billion cubic feet.	Cubic feet per second.
A.....		100	11,276
A.....		150	11,660
B.....		100	14,742
B.....		150	14,829

Comparing, now, the two methods of regulation on the Lake of the Woods, in connection with similar regulation on Rainy Lake, it appears that with 100 billion cubic feet of total storage in the upper Rainy reservoirs, method B would have permitted the utilization of 3,466 cubic feet per second, or 31 per cent more water than would method A. With 150 billion cubic feet of storage in the upper Rainy reservoirs the increase would have been 3,169 cubic feet per second, or 27 per cent. At the September, 1912, Lake of the Woods hearings Mr. J. B. Challies, superintendent Dominion water power branch, stated that "the total fall of the Winnipeg River between the Lake of the Woods and Lake Winnipeg, which can be used for power is 291 feet." Translated into horsepower produced under 290 feet of available fall, and at 80 per cent efficiency, the above quantities of water represent 91,380 and 83,550 continuous horsepower, which, if salable, at a return of even \$10 per horsepower, would have an annual value of \$913,800 and \$835,500, respectively.

Under our chapter relating to "Reservoir control in general," pages 203 and 204, we point out that without having increased outflow capacity any control of outflow must invariably result in raising the level of the lake to a higher stage than the highest level which would have occurred, under corresponding meteorological and other conditions, during the given period in a state of nature. In our

report also, page 217, we draw attention to the fact that in order to take care of excessive run-off under the conditions of artificial control of outflow from the Lake of the Woods, either the outflow capacity must be materially increased or else a certain amount of reserved storage capacity must be provided. In the case of reservoirs whose outflow is regulated according to method A, either the increased outflow capacity or the reservoir storage capacity, or both, must be substantially larger than in the case of reservoirs operated according to method B.

To have kept the level of the Lake of the Woods from rising above a prescribed, ordinary, maximum stage, it would, on the basis of the records of the past 22 years, with regulation according to method A on both Rainy Lake and on Lake of the Woods, and with 100 billion cubic feet of total storage capacity on the upper Rainy watershed, have been necessary, if no provision had been made for reserve storage, to have provided for an outflow capacity of 75,000 cubic feet per second, or twice what would have been the maximum natural discharge from the lake during the same period.

With both Rainy Lake and Lake of the Woods regulated according to method B, it would have been necessary to provide outflow capacity equal to 57,000 cubic feet per second, if no reserve storage capacity had been provided.

In case both Rainy Lake and Lake of the Woods had been regulated according to method B and the outflow capacity of the Lake of the Woods had been increased to 40,000 cubic feet per second at the ordinary maximum stage, with correspondingly greater discharge at higher stages, a reserve storage capacity of 0.9 foot would have been required in order to absorb the excess run-off into the lake during June and July, 1899. If regulated according to method A, more than 2 feet of reserve storage would have been required. From the standpoint of taking care of excessive rates of inflow alone, method of regulation A would appear to be impracticable, even disregarding the unsatisfactory results in power development from this method.

In case method of regulation B, modified by providing a total discharge capacity of 40,000 cubic feet per second at the ordinary maximum level, and also providing for about 1 foot of reserve storage capacity, were adopted, it would be necessary to discharge 16,000 cubic feet per second or over, during all years except the extremely dry ones, because efforts to save water by holding it over because not immediately needed by present installations are likely to result, sooner or later, in a higher lake stage than the prescribed one.

It appears from the curves of plate 140 that the present outflow capacity of the western outlet is relatively small. At a lake stage of 1,060 it is possible to discharge only about 25,000 cubic feet per second through the Norman Dam, even if wide open. If regulation of the level of the Lake of the Woods is to be secured through control of the outflow through the western outlet by manipulation of the Norman Dam, with its present discharging capacity, this site will be economically valueless for any large power development during a portion of every high-water year.

In order to discharge more water through the western outlet extensive excavation, particularly at the C. P. R. bridge and between the bridge and the lake, would be required, and, with the cooperation of those interested, could no doubt be made.



In order to conserve the water supply it will be necessary to improve the Norman Dam so as to prevent the excessive leakage at present occurring, and to replace the present stop logs with gates, which permit of more ready and satisfactory manipulation.

Briefly, then, to sum up, we have presented studies of regulation of Lake of the Woods, as follows:

Method A applied both to Rainy Lake and Lake of the Woods with 100 billion cubic feet of storage on the Upper Rainy reservoirs.

Method A applied both to Rainy Lake and Lake of the Woods with 150 billion cubic feet of storage on the Upper Rainy reservoirs.

Method B applied both to Rainy Lake and Lake of the Woods with 100 billion cubic feet of storage on the Upper Rainy reservoirs.

Method B applied both to Rainy Lake and Lake of the Woods with 150 billion cubic feet of storage on the Upper Rainy reservoirs.

We discuss, also, a modified method B by which provision is made for a discharge capacity of 40,000 cubic feet per second ordinary maximum levels, with provision also for about 1 foot of reserve or excess storage capacity, provision being made to discharge 16,000 cubic feet per second or over during all years except the unusually dry ones.

#### POWERS AT THE OUTLETS.

With respect to the water powers at the outlets we draw attention in our report, on page 222, to one aspect of this situation, as follows:

Apart from international considerations, but viewed from the standpoint of the interests holding water-power rights or privileges at the outlets of the Lake of the Woods, and on the Winnipeg River, it may be urged by such interests that they have undertaken developments during periods while the Lake of the Woods has been under control, and that, consequently, they are entitled to at least as advantageous conditions as they have enjoyed under such control as has been exercised in the past in the interests of navigation.

We have made a study of the power which would have been available at the outlets of the lake during the period of years 1892 to 1914, and in the report, pages 220-221, have summarized certain conclusions respecting same as follows:

First. Under natural conditions.

Second. With 100 billion cubic feet of available storage capacity on the Upper Rainy reservoirs and regulation of both the Upper Rainy reservoirs and Lake of the Woods according to method A.

Third. With 100 billion cubic feet of storage capacity on the Upper Rainy reservoirs and regulation of both the Upper Rainy reservoirs and Lake of the Woods according to method B.

The results of this study are shown in the frequency curves of plates 136 to 139, inclusive, from which it appears:

First. That under method of regulation A the lake would, on the average, have been full about 30 per cent of the time, and that under method of regulation B it would have been full about 10 per cent of the time, with a consequent greater damage to riparian property under method of regulation A than under method B.

Second. For every ordinary maximum level which may be established the available head would, on an average, be about 1.2 feet greater under method A than under method B.

Third. If an ordinary maximum level of 1061 had been established, for example, method of regulation B would, on account of

the increased utilizable flow and notwithstanding the fact that the average head would have been 1.2 feet less than under method A, have resulted in an average of 4,654 more available horsepower than method A and 4,190 more horsepower than in a state of nature.

Fourth. If an ordinary maximum level of 1,060 had been established, method of regulation B would have resulted in an average of 4,359 more available horsepower than method A and an average of 2,934 more horsepower than in a state of nature.

Fifth. If an ordinary maximum level of 1,059 had been established, method of regulation B would have resulted in an average of 4,064 more available horsepower than method A and an average of 1,678 more horsepower than in a state of nature.

It would appear from the computations on which the curves of plate 138 are based that if the outflow from the lake had been regulated according to method B and the ordinary high level maintained had been 1,057.7, practically the same amount of power would, on an average, have been available at the outlets of the lake under this method of control as would have been available under natural conditions.

#### POWERS ON THE WINNIPEG RIVER.

Regarding the water powers on the Winnipeg River below the outlets, our report, pages 226-227, summarizes certain conclusions as follows:

On the basis of the computed outflow from the Lake of the Woods, which would have prevailed under natural conditions during the past 21 years, it may be stated that 16,000 cubic feet per second would have been available for nearly 50 per cent of the time. The average amount of water which could have been utilized under natural conditions during this period of time by an installation capable of utilizing 16,000 cubic feet per second is 13,980 cubic feet per second. Under the conditions of control which existed during the same period, about 14,000 cubic feet per second would have been available 50 per cent of the time, and the average amount of water which could have been utilized by an installation capable of utilizing 14,000 cubic feet per second is 12,174 cubic feet per second. By regulating the outflow from the Lake of the Woods according to method B, so as to secure the maximum possible increase in the ordinary seasonal low-water flow, by means of a maximum range of 5 feet in the level of the lake, and with 100 billion cubic feet of total storage on the Upper Rainy reservoirs; in other words, by regulating the outflow so as to make available the greatest possible amount of water capable of economical utilization in power development there would have been an average of 14,742 cubic feet per second available during the same period of time. While the increase in utilizable flow over that available under natural conditions amounts to only about 5.5 per cent, nevertheless at \$10 per horsepower per year the average increase in utilizable flow, effected by regulation, would, under the 290 odd feet available fall in the Winnipeg River, represent a possible annual return of about \$190,000.

Now, in conclusion I would state that certain considerations regarding the necessary provision of additional discharge capacity by rock cutting at the outlet; certain problems arising from the possible utilization of the Norman Dam as a power site, and also the results of studies which we have made with some other combinations of methods A and B, such, for example, as method A on Lake of the Woods and method B on Rainy Lake, and questions of reserve storage capacity will now be presented by Mr. Meyer.

Mr. ANDERSON. I would like to ask Mr. White a question. In your studies of the situation on the various reservoirs, you did not take



each one into consideration, but you took each in relation to the other?

Mr. WHITE. We took the storage reservoirs above Rainy Lake and Kettle Falls by themselves, and then combined certain outflows from them with the waters from the Lower Lake of the Woods watershed, according to four different schemes or combinations.

Mr. ANDERSON. In other words, in order to get the best results you would have to provide for storage on each lake. You could not provide for storage on one or two lakes and leave the other uncontrolled?

Mr. WHITE. That is correct.

Mr. ANDERSON. And in all your conclusions or suggestions you tried to utilize the storage basins of the respective lakes to the best capacity?

Mr. WHITE. That is true, having respect to economical use.

Mr. ANDERSON. I think you said in answer to Mr. Powell—but I want you to be clear upon that—that the works now constructed at International Falls or the works now constructed on Rainy Lake will provide a storage of one hundred billion cubic feet?

Mr. WHITE. Rainy Lake, above International Falls, and Fort Frances; and above Kettle Falls; that is, also with lakes above Kettle Falls.

Mr. ANDERSON. With the works now there?

Mr. WHITE. Yes.

Mr. ANDERSON. The obstruction to the outlet of the Lake of the Woods goes as far back as 1879, I think you said?

Mr. WHITE. Yes.

Mr. ANDERSON. What was that obstruction that was placed there in 1879?

Mr. WHITE. It was not really an obstruction; it was an alteration or an opening made for a mill headrace.

Mr. ANDERSON. I thought you said an obstruction?

Mr. WHITE. I think in my brief survey I referred to it under alterations to the outlets.

Mr. ANDERSON. Was there not some obstruction placed at the outlet in 1879, or very shortly after?

Mr. POWELL. He spoke of the submerged dam.

Mr. ANDERSON. No; I mean something earlier than that—the railway company building the railway across there——

Mr. WHITE. Yes; we refer in the report to the railway company making a fill on their main right of way.

Mr. ANDERSON. Which would have the effect of keeping the waters in the lake back?

Mr. WHITE. Certainly; it would act as a protection against wash.

Mr. ANDERSON. What I wanted to get at was that since 1879 or 1880, or thereabouts, there had been a condition of affairs not quite natural, that there have been more or less obstructions at the outlet of the Lake of the Woods since 1879 or 1880?

Mr. WHITE. Yes.

Mr. ANDERSON. In 1887 the old Rollerway Dam was constructed?

Mr. WHITE. Yes.

Mr. ANDERSON. I think you referred in your report to Maj. Naff's report, that the construction of this old Rollerway Dam had the effect of raising the water on the lake 3 feet?

Mr. WHITE. Yes.

Mr. ANDERSON. In your report you refer to Maj. Naff's report, with reference to the effect of the Rollerway Dam upon raising the water in the Lake of the Woods?

Mr. WHITE. Yes.

Mr. ANDERSON. And in his report he said they were raised 3 feet?

Mr. WHITE. Yes.

Mr. ANDERSON. You adopt that part?

Mr. WHITE. No, we have not adopted it.

Mr. ANDERSON. That is what I wanted to find out. There was a passage in your text, at page 9, which reads:

From such inquiries as we have been able to make, it appears it was the intention of those erecting the Rollerway Dam to have the low-water level permanently raised thereby to the extent of about 3 feet.

Mr. WHITE. Yes. We simply quote Mr. Naff's report, which appears in the appendix. We indicate that from such general inquiries as we have been able to make such appears to have been the intention. We know, as a matter of fact, as we have brought out here in statements, that the level of the lake which during our period of records of 21 years has prevailed is about 3 feet higher than our natural computed levels.

Mr. ANDERSON. But your 21 years is subsequent to the erection of the Norman Dam, is it not?

Mr. WHITE. Yes.

Mr. ANDERSON. What is your opinion as to whether or not the erection of the old Rollerway Dam did have the effect of raising the water 3 feet?

Mr. WHITE. I would say that we would concur in the statement here expressed, that it may have been the intention——

Mr. ANDERSON. It is not the question of intention; it is the result.

Mr. POWELL. It is the result.

Mr. WHITE. On our plate 114 we show what actually was the effect of the Rollerway Dam as existent in 1893. Mr. Naff stated in his report that a portion of the top of the old dam had been removed.

Mr. ANDERSON. Your plate shows a little over a foot.

Mr. WHITE. Foot and a half in some places.

Mr. POWELL. Let me understand; it would appear to be a necessary consequence, or sequitur, if you raised the floor of your escape, of your outflow, 3 feet, you raise the height of the water above 3 feet; that is the lowest level you raise it, 3 feet?

Mr. WHITE. The water might rise more than that, dependent upon the structure.

Mr. POWELL. I think on reflection you would say that, because you take the section of the escape represented by, approximately by, the V; now, when you put it 3 feet you put it in the narrow part of the channel; and the higher you get, the more room there is for water to escape; and the water will move more rapidly to the lower level; consequently it would not raise it 3 feet, but you would raise the level of your pond above 3 feet?

Mr. WHITE. At the minimum stages it would be raised about 3 feet.

Mr. POWELL. But at a very high level it would be raised 2 or 3 feet?



Mr. WHITE. Yes, it might; it would depend on the cross-section at the outlet.

Mr. ANDERSON. You do not know the dimensions of the old Rollerway Dam?

Mr. WHITE. No; we have given a plate showing the remnants of it; we know approximately its length.

Mr. ANDERSON. You also state in your statement that you had come to the conclusion that 1059 would be the ordinary high-water mark in a state of nature.

Mr. WHITE. I think my expression was that it might be fairly urged; we were advancing that statement as one which we thought could fairly, or consistently, be contended for.

Mr. ANDERSON. That from all the information you have it would be a fair conclusion to come to, that 1059 would be the ordinary high-water mark in a state of nature?

Mr. WHITE. Yes.

Mr. ANDERSON. But in arriving at that, you also draw your legal conclusions, I mean that that involves a question of law as well as a question of fact?

Mr. WHITE. As construed from the legal standpoint. We have explained very fully in our report just within what confines we draw our conclusions. We explain that we think it might fairly be urged that the phrase "Ordinary high water," which is taken from the United States Statutes relating to certain rights in navigable waters, may be taken to be in the neighborhood of the stage of 1059 as mentioned in our report.

Mr. ANDERSON. I am not taking exception to your legal conclusions, but I think it is rather a deep question, and I think the lawyers on the commission may appreciate what ordinary high-water mark is. You have suggested, as a result of your investigation, certain methods of regulating the water so as to give certain results; in other words, method A and method B. As I understand you, these are only suggestions; you do not put them forward as being the proper means or only means of regulation?

Mr. WHITE. No. The reason I read that statement from page 4 of our report was in order to indicate that no definite conclusions have been reached by any one in advance of these hearings.

Mr. ANDERSON. And, as a matter of fact, it is very difficult; and don't you think it will be perhaps difficult, after the hearing is over, to reach a conclusion as to what is the best method of regulation?

Mr. WHITE. That depends, of course, on the character of the data and argument that is presented by the interests here represented.

Mr. ANDERSON. Does it not depend very largely upon what the requirements will be?

Mr. WHITE. True.

Mr. ANDERSON. On what basis would you say the commission should suggest or advise a range of levels, leaving it to whatever authority might have jurisdiction over it to determine the method afterwards, in light of the requirements of the various users?

Mr. WHITE. I think that is a question that might fittingly be addressed to the commission, rather than to me.

Mr. ANDERSON. I am asking you as a practical man. That is a matter that will naturally come before the commission.

Mr. WHITE. We prefer not to draw any definite conclusions, or express ourselves in regard to the question, until we have heard the power interests. That is the position we have taken from the start.

Mr. ANDERSON. I am suggesting that when the power interests get through you will probably not be in a position to know what their requirements will be for six or seven years, and that, therefore, the better thing to do would be to establish a range of levels which would be permitted and then let the method of regulation be adopted subsequently.

Mr. TAWNEY. Don't you think that under this reference it is the duty of the commission to make some recommendation to the Government with respect to the methods of regulation.

Mr. ANDERSON. Yes; but if you came to that conclusion you would recommend in your judgment that it would be better to leave the matter of regulation to see how events transpired, or to see what the requirements were. I think you will have to make some report upon it. Of course, these questions are so drawn that you will have to remodel them to a large extent in order to be able to give the proper solution—

Mr. POWELL. Or to interpret them very liberally.

Mr. ANDERSON. Yes; in order to make an intelligent report. I wanted to get Mr. White's idea on that point, as to whether or not it would not be better to leave the matter—

Mr. TAWNEY. That is a matter to be addressed to the commission, by those interested, rather than to the engineers.

Mr. ANDERSON. But I want to find as best I can of the commission. In connection with your methods A and B, do they both anticipate auxiliary plants?

Mr. WHITE. In a certain sense they might.

Mr. ANDERSON. Have you worked out any method which would dispense with the establishment of auxiliary plants?

Mr. WHITE. We have not fully developed any combination of methods except those indicated in the report, and such other combinations as will suggestively be presented by Mr. Meyer at this hearing.

Mr. WYVELL. Referring to page 224 of your report, will you be kind enough to say how many of the 16,000 acres of land mentioned at the top of that page as lying approximately between 1,058 and 1,060 contour are in the United States and how many in Canada? Probably it is covered by the report?

Mr. POWELL. The table shows that.

Mr. WYVELL. The table shows it under different heads. I just want to get it in the aggregate.

Mr. WHITE. The areas in acres between contours 1,058 and 1,060 are as follows:

Contours.....	1,058-1,059	1,059-1,060	1,058-1,060
Canada.....	4,253.9	4,352.4	8,606.3
United States.....	3,311.7	3,767.5	7,079.2
Total..... acres..			15,685.5

Mr. KEEFER. Among the valuable data you have gathered are you able to give the commission any idea of what amount you would allow for seepage for compensation above any fixed level? Sup-



posing navigation line is 1,060 or 1,059, whatever it is, what should you allow above that for the damage by seepage? Have you anything to report as to that?

Mr. WHITE. With every desire to answer that question, I must say that there are a number of factors to take into consideration, such as the permeability of the soil, slopes at the different stages, etc. Thus any definite answer, without dealing technically with the question, would not be profitable.

Mr. KEEFER. You could not give it roughly, so that we could estimate it.

Mr. TAWNEY. There has been no scientific investigation as to the extent of this seepage.

Mr. KEEFER. They have gathered such a lot of valuable testimony I thought they might have gone into that.

Mr. POWELL. If there is a marginal strip, say 100 feet wide, that will be overflowed by raising the level of the lake, that 100 feet is impaired, as far as its value is concerned, by the present seepage?

Mr. KEEFER. Right. If you have the water at 1055 you will have seepage, some say a foot, a foot and a half, and some say two feet. As Mr. White says, it will depend largely on the character of the soil.

Mr. MIGNAULT. It would depend on the character of the soil, and you can not lay down any hard and fast rule.

Mr. KEEFER. I thought they could give us a rough-and-ready estimate.

Mr. WHITE. The figures you mention, namely, a foot, or a foot and a half, or two feet, are the figures which I believe will be supported by testimony.

Mr. BERKMAN. How have you computed your inflows and outflows, in connection with your presentation regarding the Lake of the Woods levels?

Mr. WHITE. That is a large question to answer. It is fully set forth in the report. It was briefly outlined in my comments this morning. If any gentleman interested desires, at any time, to go into any of these more technical matters, in order to clear up some of them, either Mr. Meyer or myself will be very pleased, even outside of the hearings, to explain them.

Mr. LAIRD. As to the nature of the alterations made in 1879, did it serve to obstruct the outflow or enlarge the outflow?

Mr. WHITE. You could hardly call it an alteration; it would be more in the nature of an obstruction of any outflow. I take it, the matter that is now being referred to is the railway embankment fill. As I recall it the C. P. R. first of all had a trestle running across and subsequently they completed a solid fill and effectually closed off the seepage, which, I understand, formerly went through into some low-lying soil, muskeg in character.

Mr. LAIRD. It would have the effect of interfering with the outflow, if it was a fill.

Mr. WHITE. That would depend upon what significance here attaches to the word "outflow," and whether, at any stage of the Lake of the Woods, in a state of nature, the water was ever able to flow out by this avenue.

Mr. LAIRD. You have not sufficient information to enable you to express an opinion on that?

Mr. WHITE. No.

Mr. LAIRD. Referring to methods A and B, you state that they both contemplate an auxiliary plant, and you spoke about the auxiliary plant under method B, that it would be larger under method A?

Mr. WHITE. Yes.

Mr. LAIRD. Can you give us any comparison between the two plants?

Mr. WHITE. The remarks relating to a discussion of this kind depend very largely upon the viewpoint from which they are advanced. A steam plant, of course, might be employed as supplementary or auxiliary to any hydroelectric installation.

In our report, pages 209 and 210, we comment respecting comparative sizes of steam plants, if continuous operation is required, and we draw attention to the fact that under method B a protracted dry period would require an auxiliary steam plant 4,000 horsepower larger than any plant required for method A. Regulation by our proposed method A, as set forth in the report and by itself considered, has been treated as having no auxiliary plant.

Mr. TAYLOR. I understand another engineer is to address the commission and will probably take all the forenoon. I do not know whether you have any order in which you intend to hear the various interests here, but if you can approximately fix a time when our witnesses could be heard, I am sure it would save the time of a number of busy men.

Mr. MAGRATH. What interest?

Mr. TAYLOR. The property owners on the Lake of the Woods, men who own summer cottages and islands and locations on the Lake of the Woods.

Mr. MAGRATH. We may not be able to reach it until to-morrow afternoon, but I think you had better be here in the forenoon at 10 o'clock.

Mr. ANDERSON. Perhaps this would be an opportune time to settle the question of what interests you are to hear at this meeting. I understood it was called to hear the power interests.

Mr. TAYLOR. I find that Mr. Deacon, one of the witnesses upon whom we intend to rely a great deal for the presentation, can not be here in the forenoon, and the afternoon would suit him better.

Mr. TAWNEY. This hearing was called primarily for the purpose of hearing those interested in the development of water power on the Lake of the Woods, Rainy Lake, and Rainy River. I think they have a right to be heard to the end of that hearing first, and that then those interests that have subsequently asked to be heard be taken up and heard; but the power interests have made preparations to be here, and they have their witnesses here, and it is only fair that they should be heard to their conclusion, and then the other interests could be heard subsequently.

Mr. MIGNAULT. That is proper.

Mr. TAYLOR. We are quite prepared to have our hearing last. We simply do not want to wait.

Mr. TAWNEY. You simply want some idea of when you are to be heard.

Mr. ANDERSON. On the question of what interest should be heard, as far as we are concerned, we do not care, but I do not speak for the private interests. For instance, if you are going to hear the campers,



we would be satisfied that they should present their case first; but I would like to know whether this is a wide open session or confined to certain things.

MR. ROCKWOOD. I think it entirely possible that the commission may feel constrained to hear all interests before reaching a conclusion, if it is possible to do so, and hear them as fully as reasonable. It occurs to me that it might be as well for the power interests before finishing their own presentation to know everything that they have to consider, everything that the commission will have to consider in making final reports that will affect the power interests. It occurs to me that it is well for those in my own situation to hear all the property owners before we are called upon to finish.

MR. LAIRD. So far as I am concerned, I agree with what Mr. Rockwood states. I thought we were at the end of the property interests last September, and the interests I represented asked for an extension of time to meet some of that evidence, and were absolutely refused an opportunity of doing so, and now, in the February sitting, we are met with further property interests, and if they are to be heard I submit they should be heard first and open up the whole question of property interests at the same time.

MR. KEEFER. Speaking for the Government, we should be careful to try and conserve as much as possible all the interests, but I think it would be right for the Government to hear the complaints of all the property interests before they start in.

MR. MAGRATH. Our business is to get at the facts, and as we are here to hear the power interests it has been suggested to me that we should go ahead and hear them, and then we can decide what we will do afterwards; but, so far as I am concerned, anyone who has anything to say in reference to this question, I think, should be heard.

MRS. CAMPBELL. I agree, for the city, with what Mr. Rockwood has said for his clients, and subject to the convenience of the commission; if Mr. Taylor and his clients want to be heard first we have no objection.

MR. MIGNAULT. How long would it take you to present the case for the summer resorts?

MR. TAYLOR. I would think approximately an hour and a half or two hours.

MR. MIGNAULT. Have you many witnesses?

MR. TAYLOR. Five or six, but several of them will be very short.

MR. MAGRATH. We will hear you at 2 o'clock.

MR. KEEFER. Would it not be well to ascertain if there is any other interest besides the cottagers on the Lake of the Woods that desires to be heard?

MR. MAGRATH. As we have decided to put off the power interests, we will proceed with any private interests that desire to be heard, and then deal with the power interests; so that we want you to follow up with any other testimony you want to offer.

MR. TAWNEY. I desire to supplement what Mr. Magrath has said by making the statement that this applies to the Canadian Northern, who wish to present a matter here, and also to those people of Minnesota who are interested in the question of ditches and the effect of lake levels upon the ditch system of northern Minnesota.

Mr. CAMPBELL. In regard to that matter last Friday we learned that there would be an application made. Mr. Tawney announced it at International Falls. I have no objection to the application being made, but we may not be able to get a witness from the South till Thursday morning. We should have an opportunity to present some facts later on. I would not want that matter to be closed on both sides.

(The commission adjourned till 2 p. m.)

At 2 p. m. the commission resumed.

Mr. MAGRATH. You may proceed now, Mr. Taylor.

Mr. TAYLOR. I wish to present the petition of certain property holders on the Lake of the Woods. They are persons who have islands with summer homes built upon them or locations on the shore with summer homes, and many other persons who have a number of islands which are not built upon. I want to assure the commission that the petition is not as long and bulky as it appears. It has been signed individually by the different members, but attached to it is a list of something over 70 of the persons who have signed the petition. The petition is as follows:

#### EXHIBIT A.

#### TO THE JOINT INTERNATIONAL WATERWAYS COMMISSION:

The petition of the undersigned humbly sheweth as follows:

1. That your petitioners are the owners of properties situated in or upon the Lake of the Woods. In most cases the properties held consist of an island in or a location upon the said lake, having built thereon a summer home with boat-house and dock. Among the undersigned are certain persons who hold several islands in the said lake, which they expect to dispose of for summer homes.

2. Your petitioners have recently learned that there is a movement on foot to have the maximum water level of the said lake raised much higher than it was at its highest point in the season of 1915.

3. Your petitioners are further informed that your body, meeting in the city of Winnipeg, is to take the evidence of the owners of islands, locations, and summer homes on the said lake, with a view to ascertaining how the raising of the level of the said lake will affect such interests.

4. Your petitioners are of the opinion that if the level of the waters of the said lake were to be raised as above indicated it would cause most serious damage to their interests and to the interests of many other owners of such property who have not had an opportunity to sign this petition, owing to lack of time to communicate with such owners.

5. Your petitioners submit that among the injuries which would be caused to such properties would be the following:

(a) The destruction of the beaches on most of the islands and locations.

(b) In the case of very many islands the raising of the level of the lake as indicated would submerge a considerable portion of these properties and render them of very much less value than they are at the present time.

(c) To permanently raise the level of the lake as indicated would so change the shore line of the said lake that it would lessen to a great extent the beauty of the said lake as a summer resort. It would cause the timber on the shores of these properties to die, fall into the lake, and disfigure the properties. The removing of this debris would cause expense to the owners, as well as add to the danger of fires from the dead lumber.

(d) Most of your petitioners have incurred large expense in the building of boat-houses and docks and otherwise improving their properties, which would be very seriously damaged by the raising of the waters of the lake as aforesaid.

(e) The Lake of the Woods is one of the finest, if not the finest, summer resorts on the continent of America, and its use for this purpose is at the present time very small compared with what future development is likely to be if the lake level is maintained at the proper maximum of water level.



6. Your petitioners are also property holders and tax payers of the city of Winnipeg, and have no desire to detract from the value of the water power of said city, of which, as citizens, we are part owners, nor do we desire to injure the property of any other persons, but, at the same time, we wish to protect our interests and property rights, and we believe that it is possible to do so and at the same time protect the rights of all other interested parties.

7. Your petitioners are of the opinion that if the maximum level of the lake was fixed at the level which it held on September 1, 1915, it would be a level which would be fairly satisfactory to all the owners of the said properties. Such a level would be higher than is desired by many of the property owners, but it would not do any serious damage to the majority of the properties in question as would be the case if the very high level was adopted, which we are informed has been suggested.

And as in duty bound your petitioners will ever pray.

C. H. CHAMBRE.

Per H. W. ALAN CHAMBRE.

Dated at Winnipeg, this 19th day of January, A. D. 1916.

Mr. TAYLOR. I desire to give the evidence of Thomas R. Deacon.

### TESTIMONY OF MR. THOMAS R. DEACON, OF WINNIPEG, CANADA.

THOMAS R. DEACON, having been duly sworn, testified as follows:

Mr. TAYLOR. Is your residence in the city of Winnipeg?

Mr. DEACON. Yes.

Mr. TAYLOR. What is your profession?

Mr. DEACON. Civil engineer by profession, and manufacturer at the present time.

Mr. TAYLOR. What business are you carrying on?

Mr. DEACON. I am in the steel and iron business, and am manufacturing structural steel for railway bridges, and also general manufacturing for grain elevators, sawmill machinery, etc.

Mr. TAYLOR. I understand that you lived for a number of years at the Lake of the Woods?

Mr. DEACON. I lived there 10 years—1892 to 1902.

Mr. TAYLOR. As an engineer and a resident of that district, you are quite familiar with the Lake of the Woods and its waters and islands?

Mr. DEACON. Yes; I think I am.

Mr. TAYLOR. Would you just proceed with what you have to say regarding the matters before the commission, without any further questions?

Mr. DEACON. You mean for me to make a statement?

Mr. TAYLOR. Yes.

Mr. DEACON. The general statement I would make in regard to the camping or tourist interests would be about as follows: 'This is a case where the same men have different interests. The people who camp at the Lake of the Woods are practically all residents of the city of Winnipeg, mostly large property holders of the city of Winnipeg, and therefore interested in the city's power and light plant. They also own their islands and summer cottages and other accessories on the Lake of the Woods, and they feel—and I think they are correct—that the excessive height of the water would do very serious damage to the properties there. I think that is obvious, as most of the members of the commission have visited the lake there; and it would be quite obvious that most of the properties would be damaged by the flooding of the beaches, and particularly the destruction

of the scenic beauty of their places. It is the principal resort of the business and professional men of Winnipeg. It is the place to take their families in the summer, and the children; it is a great benefit for all their families and especially the children, and its value could scarcely be set in a money way. The business—I could scarcely say the business, but the word has slipped my mind for the moment—of the summer-resort business of that lake is increasing very fast. I should say it has doubled in the last five years; and if it were not for the temporary setback due to slack times and the war in which we are engaged as part of the Empire at the present time, in course of time—not so long a time, either—it would exceed all other interests except the Canadian Pacific Railway on the northern shore of the lake. I have observed the conditions there and been interested in the town for 23 years, and that seems to be the business that is destined to be the largest interest there, except the railway business.

I think it is obvious that the lumber business is rapidly decreasing; it is practically a vanishing industry, and whatever large amount of logs was towed in former years, that probably in not to exceed 10 years there will be no logs towed on the Lake of the Woods. There may be ties or pulp wood or some light stuff, but the lumbering can not endure for a very long time. The growth of timber is very slow there, and when the lumbering is gone the steamboat interests will be very small—they are very small now. I think the manager of the only large steamboat on the lake gave evidence at Kenora last fall that, notwithstanding the subsidy of \$84,000 from the Dominion Government, the boat had never paid. It is hardly probable that that will be kept up indefinitely, and it is very doubtful if the flour industry will be greatly increased there. If the statement of the people in the flour-mill business is correct, that it is not the proper place to mill flour, that it should be milled on property where the offal could be sold to the stock raisers or carried through as wheat farther east, to where there is stock and hogs and poultry raised, then it would naturally follow that the flour-mill industry would not increase there; in fact, one of the flour mills has half its space standing for four or five years without equipment in it, I believe. On the other hand, every year sees a very large increase in the tourist and summer-resort business, and it will be correspondingly large when other railways touch that lake, as they no doubt will. The campers' association and those interested there are very anxious to avoid saying or doing anything that will injure any of the other interests.

All they wish is to protect their own interests within reasonable limits, and I believe that they would be prepared to make considerable sacrifice rather than to say or do anything that would injure the interests, particularly of the people of the city of Winnipeg—that is, the power interests of the city of Winnipeg—or the Electric Street Railway Co. I do not think the larger milling company at Keewatin, the Lake of the Woods flour mill, are very much interested. They have never, I believe, been short of power at their plant there, and are not likely to be affected. The statement that has been published in the press here, that it was proposed to fix an extreme high water of 1,062 would be obviously injurious to the people engaged in camping. It would practically flood out all their



beaches and bring the water up 6 or 8 inches above, I think, high-water mark. The suggestion that we had to make, as an alternative for that, so that all the interests could be conserved, was that an attempt should be made to control the lake within a range of about 3 feet. When they speak of a range of 5 feet, so far as I am personally concerned, I can not see very much object in doing anything, because the range is not that now normally. The range, I think, can be controlled with the present dam there within about 3 feet. On account of the lack of rain in 1910—it was an extraordinarily dry season—and the stop logs were left out of the dam too late, the basin was emptied too low before they were put back to save the water, and consequently the water was very low in 1911. It takes nearly a season for the effect of the rain to be felt.

We thought that by adopting a system of storage in the upper lakes, the Manitou Lake, Namakin Lake and the lakes back there, and Turtle Lake, and a secondary level in Rainy Lake, and a storage there, and using the Lake of the Woods as a balancing reservoir, that the whole object could be accomplished of giving the power interests a uniform flow, or as nearly a uniform flow as possible throughout the year, without at any period raising the water so high as to damage the interests of the people having summer homes on the lake. High water usually occurs in June; toward the latter part of June, I think, it is invariably at the maximum; that is the very time people go to the lake. They camp there the last part of June, July, and August, and mostly return to the city about the first of September, when the water has begun to fall; consequently if there was an extreme maximum, that is the very time it would injure them the most. With regard to the minimum, speaking from the campers' standpoint, they are not greatly interested in a minimum, provided the maximum is not too high, but at the same time, as residents of the city of Winnipeg, and personally as the projector of the greater Winnipeg scheme, I would not like to see anything—and I would make any sacrifice to prevent it—done that would affect the flow of water in the aqueduct; but the water would have to be pretty low, lower than natural, to affect that. The intake of that aqueduct is in the Shoal Lake and not in the main body of the Lake of the Woods, and is at 1,060.8. The intake requires about 8 feet to give it its maximum flow, so that it would require between 1,068 and 1,069 to give it its maximum flow of 10 million gallons.

Mr. POWELL. 1,058 or 1,068?

Mr. DEACON. 1,058.

Mr. POWELL. You said 1,068?

Mr. DEACON. That is wrong; 1,058.8 is the intake I understand. If the project of using the Lake of the Woods as a balancing reservoir can be carried out, and using the upper levels as storage, the whole object can be accomplished of protecting the interests of the summer tourists, protecting the power interests, and protecting the greater Winnipeg water district aqueduct. That can be done in another way. At extreme high water, when the water flows in, a lock could be established at Ash Rapids and lock the water in there when you had 3 or 4 feet more than you needed, and draw that off at high water.

Mr. GLENN. What is the highest level you can suggest to protect both the campers and at the same time protect the power interests?

Mr. DEACON. The campers have suggested at a meeting by a unanimous vote that they wanted it the same as it was on the 1st of September.

Mr. TAYLOR. 1,060?

Mr. DEACON. 1,060 $\frac{1}{2}$ ; personally I think that is a little lower than is practicable. I think you would have to have it about 1,061 as a maximum. I do not think anybody would suffer very much at 1,060.

Mr. TAWNEY. You appeared before the commission at Kenora in September, 1912?

Mr. DEACON. Yes.

Mr. TAWNEY. Do you recall at that time that the lake was 1,060; and in answer to a question, "Have you any suggestions as to what level the lake should be maintained with reference to the present level of the lake," you answered, "From my general knowledge of the conditions here, both of navigation and power, I should think it would be in the interests of every person concerned to maintain it at its present level, or a little higher than the present level—at all events, not below the present level"?

Mr. DEACON. What was it then?

Mr. TAWNEY. 1,060.

Mr. DEACON. That is what I say now.

Mr. TAWNEY. 1,060 $\frac{1}{2}$  is about what you now recommend as proper?

Mr. DEACON. Yes; practically, as an engineer, I think, that will be a little difficult to accomplish. I think you will have to have a little higher maximum than that, probably 1,061.

Mr. TAWNEY. That is, in order to maintain a reasonable range of levels?

Mr. DEACON. Yes; I thought, if it was within the bounds of practicability, it should be arranged between 1,061 and 1,058; and if it can not be kept within the bounds of 3 feet, very little will be accomplished by the expenditure of money.

Mr. TAWNEY. Have you taken into consideration the extent to which the discharge at the cross-section has to be enlarged in order to maintain a range of levels within the 3 feet? The discharge of the outlet would have to be increased, in order to maintain a range of 3 feet?

Mr. DEACON. No; I have not gone into that detail.

Mr. TAWNEY. It would have to be very materially increased; the discharge at the cross-section would have to be very materially increased to maintain a range of level within 3 feet?

Mr. DEACON. I do not know. Some engineers say that; I have not gone into that.

Mr. TAWNEY. In a state of nature, do you know what the level of the Lake of the Woods has been?

Mr. DEACON. I have a geological map prepared in 1885 of the Lake of the Woods by the Dominion Government from surveys made by Tyrrell Barlow and Lawson in 1882 and 1883 and 1884 and from information obtained from the International Boundary Commission. This shows a complete range of levels from 1,057 to 1,060, a range of 3 feet.

Mr. TAWNEY. The records since 1893 show a range of 10 feet.

Mr. DEACON. Since 1893?



Mr. TAWNEY. Yes.

Mr. DEACON. Oh, no. I came to Kenora in 1892 and have been on the lake ever since, and there has never been any such range as that.

Mr. TAWNEY. Eight feet; it is my mistake.

Mr. DEACON. The big boom was built in 1894.

Mr. POWELL. That is the range of levels which would have existed if the state of nature had been continued.

Mr. DEACON. That is the computed range; I do not know whether that would be the case or not.

Mr. KEEFER. I think you were present at Kenora when Mr. Mather gave his evidence?

Mr. DEACON. Yes; I was present.

Mr. KEEFER. And do you recall saying that you agreed generally with what Mr. Mather said. "Mr. T. R. Deacon appeared before the commission and stated that he agreed personally with what Mr. Mather had said." Is that correct?

Mr. DEACON. I have no doubt it is, if it is there.

Mr. KEEFER. Don't you recall that Mr. Mather was advocating that we should have a range up to what is called Kennedy's high-water mark, 1,062.8; that is what Mr. Mather was advocating?

Mr. DEACON. 1,062.8?

Mr. KEEFER. Yes; that it should come up to that point; at all events you heard Mr. Mather and you still agree with what he said?

Mr. DEACON. Yes; if it is recorded there; I do not agree that Mr. Mather said it should be 62.8.

Mr. KEEFER. Are you an engineer?

Mr. DEACON. Yes.

Mr. KEEFER. You said, taking all things into consideration, that no greater range than 3 feet should be permitted on the Lake of the Woods?

Mr. DEACON. I did not say that.

Mr. KEEFER. That was the ideal?

Mr. DEACON. Yes.

Mr. KEEFER. But we have to take the practical question. Now, what would be the practical side of the question?

Mr. DEACON. I do not know. I have not gone into that question.

Mr. KEEFER. I would understand, as a good citizen of Winnipeg, you would not want to put the necessary requirements behind your personal interests, if it were found necessary to have a wider range?

Mr. DEACON. I object to that way of putting it, that we are animated by selfish motives.

Mr. KEEFER. If it were found in the general interests of the public—

Mr. DEACON. What do you mean by that?

Mr. KEEFER. The endeavor to get the greatest amount of power for this city, for instance, which is a very important question. If you found that it was necessary to have a wider range to accomplish that, what would you say?

Mr. DEACON. I would say, in answer to that question, that I think the damages supposed to come to the city of Winnipeg's water power is more imaginary than real; that the people who own the islands have an immediate, apparent, and real damage if they are flooded out. The damage to the city of Winnipeg is very remote to the

water power, for the reason that they do not get half their water from the Lake of the Woods Basin at all.

Mr. KEEFER. I have no doubt the city of Winnipeg would give us their view about that, whatever it is, from their engineers; but if it were found necessary in the public interest to have a wider range and any of the campers as well as the agricultural interests were compensated for any damage that flowed to them, you would not, as a citizen, advocate that that wide range should not be adopted?

Mr. DEACON. What wide range?

Mr. KEEFER. Say 5 feet, that we have talked about.

Mr. DEACON. I have stated what I think ought to be aimed at——

Mr. KEEFER. You have told me that is the ideal.

Mr. DEACON. Yes.

Mr. KEEFER. But if you, as a camper, were compensated, and it was found necessary to have a wider range, what position do you take?

Mr. DEACON. I do not think I should be asked to answer that question. I have interests in both places. I am a large taxpayer.

Mr. KEEFER. The interests would conflict?

Mr. DEACON. Yes.

Mr. KEEFER. Which would be the greater interest, your personal interest or your interest as a citizen of Winnipeg?

Mr. DEACON. I would decide that when the question arose.

Mr. GLENN. Can you compensate the campers in dollars and cents for the injuries they sustained?

Mr. DEACON. No; you could not.

Mr. KEEFER. You could compensate for the extra rise of a foot or so to the campers?

Mr. DEACON. You could make them put up with it.

Mr. KEEFER. Do you know the level of the floor of your boathouse?

Mr. DEACON. No.

Mr. KEEFER. I am instructed it is about 1,060?

Mr. DEACON. You know more about it than I do.

Mr. KEEFER. It would not be a difficult matter to raise the floor of your boathouse?

Mr. DEACON. Which floors? There are three floors.

Mr. KEEFER. I did not know there were three floors.

Mr. DEACON. Yes; I have been moving it up as the water came up.

Mr. KEEFER. You could continue to move it up?

Mr. DEACON. I do not count my boathouse to amount to anything; it would not cost me anything, and I would not know it—well, I would know it, but it would not be a serious proposition. You are referring to the little island my family use, but I am interested in a number of other properties besides that.

Mr. KEEFER. Islands?

Mr. DEACON. Yes.

Mr. KEEFER. I suppose some of those would be affected by having high water?

Mr. DEACON. Yes.

Mr. KEEFER. And they would be subject to compensation?

Mr. DEACON. I suppose they would; yes.

Mr. GARDNER. The Winnipeg Power Co. develop power at the mouth of the lake?

Mr. DEACON. No.



Mr. GARDNER. Or up to the Norman Dam?

Mr. DEACON. No; their power plant is in the Province of Manitoba.

Mr. GARDNER. Further down still?

Mr. DEACON. Yes. I would like to add a word in answer to the suggestion of Mr. Keefer, that we are animated by some opposition to the city's power plant. I think that I have the interests of the city of Winnipeg at heart just as much as any other man. I was mayor of the city for two years previous to the present mayor, and I did what I could in the interests of the city at that time, and I think I am not doing anything derogatory to their power interests in joining with my friends and neighbors on the Lake of the Woods to protect our interests there. We believe that all the interests can be protected without any serious damage to anybody, but if we have to make some sacrifices we are prepared to make them within limits. It is not particularly our boathouses that we care about, it is the damage to the property itself. We do not want damages, we are not laying the foundation for a claim for damages. We want the damage not to be done.

Mr. TAYLOR. Have you anything to add about the supply of water below Kenora?

Mr. DEACON. Nothing more than if there was only the one water power, it might make a very much greater difference, but it is well known that there are hundreds of thousands of horsepower not developed, at all there—five or six falls there that are not developed; perhaps the best fall in the river, two of them are not developed at all.

Mr. WYVELL. Have you read the report of the engineers, the text of the new report just issued?

Mr. DEACON. No, sir. I never knew it was issued at all.

Mr. WYVELL. Mr. White referred to it this morning. At page 227 the engineers state that only  $5\frac{5}{10}$  per cent increase would result from the control of the outlet of the Lake of the Woods over natural conditions. That is, assuming ideal conditions, the water powers would get 100 per cent. and under natural conditions they still get  $94\frac{5}{10}$ .

Mr. DEACON. Yes.

Mr. WYVELL. In other words, that the control of the outlets of the lake only affected the water-power interests to the extent of  $5\frac{5}{10}$  per cent. I thought you would like to know that in answering future questions that may be put to you. Assuming you desire ideal conditions to exist in the lake for summer-resort purposes, what level would you suggest to protect the beaches and generally make conditions ideal at the lake?

Mr. DEACON. Speaking ideally, I think the campers' association have hit it pretty close—1,060.8.

Mr. WYVELL. And at that level the sandy beaches would be left intact?

Mr. DEACON. Yes; nice place for children to play.

Mr. WYVELL. Is the plant of the city of Winnipeg below the point where the English River strikes the Winnipeg River?

Mr. DEACON. Yes.

Mr. WYVELL. So that a large part of the water which helps make the power for the city of Winnipeg is derived from the English River, is it not?

Mr. DEACON. Yes.

Mr. KEEFER. You were asked also about that high-water mark on the rocks; you have seen it every summer for 20 years you have said. You know what I am referring to:

Question by Mr. CASGRAIN. What about this water mark on the rock; have you seen that for a long time?

I have seen it every summer for 20 years.

You recall that; that is correct?

Mr. DEACON. Yes; that is correct.

Mr. KEEFER. Then, you were asked, "Have you ever seen the water as high as the higher of these two marks?" "I think I have; I think I saw it once right up to the upper mark." "When was that?" And the answer, "As near as I can recollect, it was in the fall of 1900." I suppose that evidence still stands?

Mr. DEACON. Yes.

Mr. KEEFER. I spoke to you about Mr. Mather. You said in your opening remarks that you agreed with what Mr. Mather said. Mr. Mather was examined by Mr. Casgrain, and he was asked: "Can you speak as to what levels the water should be kept at in order to give sufficient water power to the different industries? Have you any information to give the commission on that score?" And Mr. Mather said, "I think they should be kept about high-water mark; that is the natural high level." Then, he was asked, "How would that compare with the level at the present time?" (1,060) and he answered, "The level now is, I fancy, from about 18 inches to 2 feet lower than that. You possibly noticed in coming down the lake yesterday two distinct marks along the shore"—

Mr. DEACON. Who said that?

Mr. KEEFER. Mr. Mather, and you agreed with him. "You possibly noticed in coming down the lake yesterday two distinct marks along the shore, one about 6 inches lower than the other. The water has been up to the lower mark and possibly an inch or two above it a number of times since I have been in the country, but I have never seen it up to the higher mark." Then, he is asked, "And that lower mark is how many inches above the present level?" And he answers, "About 18 inches, I should say; I have not measured it." He advocates it coming up to that point.

Mr. DEACON. I said I agreed generally with what he said.

Mr. KEEFER. And if in the interests of the power companies it was found advisable to go up to the high-water mark, 1,062.8, and the Government of the country or power interests compensated, you would not find any fault, if it was found necessary in the public interest, as a good citizen of the country?

Mr. DEACON. I would consider 1,062.8 would do a very great damage.

Mr. KEEFER. Do not imagine people want something for nothing; the people will be compensated, you know.

Mr. DEACON. It is not damages they want.

Mr. KEEFER. You were asked, "Can you compensate in dollars and cents the loss to industries by water?" and you answer "No." "And you can compensate campers for the damage to their property?" and you answer "Yes." That still stands?



Mr. DEACON. I did not so understand it. I understood he asked me, "Could you compensate them for loss to their camping property?" and I said, "No; there is certain sentimental!"—

Mr. POWELL. It is like patriotism; it is sentiment.

Mr. DEACON. There is a value you attach to a summer home that you do not want to sell for money.

Mr. GLENN. Health conditions also?

Mr. DEACON. Yes.

Mr. TAYLOR. In regard to the beaches, the islands, and timber, if they were seriously injured, could compensation make up for it each day as a summer resort and its future as a summer resort?

Mr. DEACON. You can not replace it; it is a very slow growth; the whole face of the country shows when it is burned off it takes generations to reforest in this climate.

Mr. MAGRATH. You feel that 1,061 would be an ideal high level?

Mr. DEACON. I would say so, personally.

Mr. MAGRATH. And you think that 3 below that would be an ideal low level?

Mr. DEACON. I do.

Mr. MAGRATH. Supposing it would be necessary to have a range of 4 feet, would that have any bearing on your high level? Would you still insist on 1,061 as your high level?

Mr. DEACON. No; I would not. I would stretch it up another half a foot.

Mr. MAGRATH. So that if it is impracticable to keep the range within 3 feet, you would change your views as to the high level?

Mr. DEACON. I think it would be necessary, in the interests of the city of Winnipeg, to move it up another half a foot, to put the water scheme out of all doubt.

Mr. POWELL. The interest of the camping association would require the low limit to be as high as possible?

Mr. DEACON. I believe the campers are patriotic enough to the city, although their interests are divided—each man's own interests are divided—that they would rather surrender another half a foot than do any serious damage or put the water project in peril; but we do not think it is necessary to do that.

Mr. POWELL. The interests of the campers would be subserved by having the low level as high as possible, so to speak?

Mr. DEACON. Yes; a range anywhere from 1,061 to 1,058—

Mr. POWELL. Do you think it would be well to have the range of levels somewhere within 3 feet?

Mr. DEACON. If possible; if practicable.

Mr. POWELL. Let me put this question to you: The limitation of the range of levels necessarily implies more waste water, does it not, at certain times?

Mr. DEACON. I do not know that; if the engineers have gone into the precise quantities and figured them out, that is purely a matter of supply and discharge.

Mr. POWELL. There are two factors?

Mr. DEACON. Yes.

Mr. POWELL. Looking at the state of affairs at Kenora?

Mr. DEACON. Yes.

Mr. POWELL. There is the constant factor—that is, the flow down Rainy River?

Mr. DEACON. Yes.

Mr. POWELL. There is the variable factor, owing to the precipitation on Lake of the Woods itself?

Mr. DEACON. Yes.

Mr. POWELL. Cutting off the constant factor, would it not be a necessary condition that you should have a greater control of the flow of the outlet in order to reduce your range of levels?

Mr. DEACON. Yes; but suppose you handled the control higher up and used the Lake of the Woods as a balancing basin——

Mr. POWELL. I am eliminating that.

Mr. DEACON. When you are speaking of precipitation are you speaking with reference to the Lake of the Woods and tributaries?

Mr. POWELL. The Lake of the Woods and basin of the Lake of the Woods.

Mr. DEACON. On the east side of the Lake of the Woods, from Whitefish Bay in there, there is a chain of comparatively large lakes in there—Whitefish Lake, and Dryberry Lake, and Crow Lake, and Lake Rowan, and a number of lakes—with the precipitation which falls over that area and finally discharges from Whitefish into Dryberry, into Lake of the Woods, that could be controlled when it was required, so that you would have the natural precipitation at the Lake of the Woods.

Mr. POWELL. You think that can be controlled?

Mr. DEACON. Yes.

Mr. POWELL. You speak of the interests of Winnipeg?

Mr. DEACON. Yes.

Mr. POWELL. As a general proposition, uniformity of flow is very desirable in power interests?

Mr. DEACON. Yes; if you are raising up to anywhere near your limit; but if not, it is a matter of indifference.

Mr. POWELL. It is very desirable in using the power of the stream that you should have the flow as uniform as possible?

Mr. DEACON. Yes; if you are using it.

Mr. POWELL. Because the utility of the stream is the minimum flow?

Mr. DEACON. Yes.

Mr. POWELL. Now. I want to point out to you that the city of Winnipeg is decidedly adverse to that proposition, because Winnipeg consumes the power during the winter months and not during the summer months. In the summer months you require very little electric light and in wintertime you require an enormous quantity of it?

Mr. DEACON. Yes; but we are not using anything like the capacity of the plant. When I was mayor the statement was made to me by the power manager, and repeatedly laid before the board of control, and repeatedly made by the controller having charge of that department, that the maximum amount of power we were bringing into the city was about 22,000 horsepower, and that we had connected 122,000 horsepower, or about six times the amount of horsepower we had brought in there——

Mr. POWELL. But we have to look to the possibility of Winnipeg becoming a second Chicago, which is not an unreasonable supposition. At that time this power question is going to be a tremen-



dously vital question for Winnipeg. Looking to the future, when you are going to utilize the whole power, at that time would you not require a greater flow in the winter months than in the summer months?

Mr. DEACON. Not any greater, but as great; you would want the same amount of water going through the wheels to produce the same amount of power.

Mr. POWELL. But you are using more power in wintertime than in summer?

Mr. DEACON. Yes; measured in total volume, but you may be using just as much for an hour at night as in winter; the difference is that you burn the lights longer; but this is not the only power on the river.

Mr. CAMPBELL. Mr. Deacon, I am not going to take you over the boathouses and wharves, which at the most would be subjects of compensation, but are there not many of the islands which rise fairly abruptly and to a considerable height above the water?

Mr. DEACON. Yes.

Mr. CAMPBELL. Apart from damages to their sandy beaches and some injury to timber immediately at the margin of land and water, scenic beauty there would not be destroyed?

Mr. DEACON. In some cases it would be improved, perhaps.

Mr. CAMPBELL. Can you give me an idea from the association as to how many of the present campers on the island—I mean including men like yourself—who own islands not yet occupied who would be injured irreparably?

Mr. DEACON. I could not tell you that.

Mr. CAMPBELL. Is there any way of getting that information?

Mr. DEACON. I presume Mr. Taylor has some men here who can tell you what damage will be done to their property.

Mr. CAMPBELL. How many islands are there in the north end of the lake?

Mr. DEACON. I do not know. There are said to be 14,000 for the total lake. I suppose there would be 10,000 or 12,000.

Mr. CAMPBELL. How many of those would be islands fit for occupancy? I suppose many of them are merely points of rock?

Mr. DEACON. I think there are many islands there. It depends entirely upon the growth of population here as to the number of islands that would be occupied there.

Mr. CAMPBELL. But I would like to get some idea as to the proportion of those islands that would be irreparably injured by a rise of 2 feet in the waters; that is, the injury to the island for occupancy and quite apart from the existing flooding. We can compensate for improvements but not for all destroyed islands.

Mr. DEACON. It would cost more to get that information than the 5 or 6 per cent range of power would be worth from a practical standpoint.

Mr. CAMPBELL. I should think from the association we ought to be able to get it. At any rate, the information is not in your possession?

Mr. DEACON. No; certainly not.

Mr. BERKMAN. Some reference has been made in the report of the engineers in regard to the docks and the values of them. Now, if lower water were established, would the cost of lowering the docks be very much around Kenora?

Mr. DEACON. I do not suppose anybody would lower his dock. Those who have put in false floors on account of the high water would like to pull them away and use them.

Mr. BERKMAN. In case the level of the lake were established, say, at 1,057, would there be much necessity for lowering the docks?

Mr. DEACON. I think a good many would have to move their boat-houses out into the lake.

Mr. BERKMAN. Would that be very much of an expense?

Mr. DEACON. It would likely cost each of them a couple of hundred dollars; some of them more and some less.

Mr. BERKMAN. If the lake were established at that level it would expose some sand beaches, would it not?

Mr. DEACON. Yes; it probably would; but it would expose the whole of those that are there, anyway. It might also do other damage.

Mr. BERKMAN. Are you aware that the engineers' computed level for the last 9 or 10 years did not bring the lake over 1,057 more than once or twice during that period?

Mr. DEACON. I can not understand that statement. Do I understand you to say that the average level of the lake for the last 10 years has been only 1,057?

Mr. BERKMAN. The computed natural level. They have figured out what the level of the water of the lake would be with the outlet in a state of nature.

Mr. DEACON. The obstruction is there, and I do not care to express any opinion as to what it would have been if it had not been there.

Mr. BERKMAN. I am not questioning you on that proposition. It is a hypothetical question, because it is a hypothetical proposition on their part. They have figured it out from certain data that it would be there. Would that be damaging to the interests of the campers if it had been that in a state of nature for the last 10 years?

Mr. DEACON. As the camping business has been in existence for 10 years, but has been largely developed to its present proportions in the last few years and more largely in the last 5 or 6 years than at any other time, and as it has been established with the approximate summer levels which have existed in that time, it would naturally damage them if it were brought much below the normal level.

Mr. TAWNEY. Mr. Chairman, a statement was made a few moments ago, by Mr. Wyvell, based upon a statement in the report of the consulting engineers, to the effect that the regulation of levels of the Lake of the Woods would benefit the power interests only about 5.5 per cent. I do not think that the statement in the engineers' report justifies that inference, and I would, therefore, suggest that Mr. Meyer be allowed to explain the statement that is referred to by Mr. Wyvell.

• Mr. GLENN. Let him do that when he gets through.

Mr. TAWNEY. I think it should be done now because inferences are being drawn from it.

Mr. WYVELL. I want to correct that statement. I meant to quote from the book, but I do not think I did, and I would like to use the language of the report. Where I said percentage of advantage I should have said an increase in utilizable flow, and I did not intend to misquote or draw any inference that was not in the book. I presume



I did not use the exact language of the report, and if I may be permitted, I will ask that the record be corrected so as to read in the statement that I made to the witness that the increase of utilizable flow as a result of control would be 5.5.

Mr. TAWNEY. Under what plan; plan A or plan B? It was in order to make that clear that I asked that Mr. Meyer be permitted to explain the matter.

Mr. WYVELL. I wanted to explain on my part that I did not intend to misquote the report. I just wanted my own statement corrected to show the use of the words "utilizable flow."

Mr. CAMPBELL. That is plan B, is it not, when B is at the lowest point?

Mr. MEYER. That sentence should be read in connection with the entire paragraph on page 227, which starts out with the statement that on the basis of the computed outflow from the Lake of the Woods which would have prevailed under natural conditions during the past 21 years it may be stated that 16,000 cubic feet per second would have been available for nearly 50 per cent of the time. Then we assume that if there had been an installation capable of using 16,000 cubic feet per second there would have been an average of 13,980 cubic feet per second of water available under natural conditions. We then go on to state that if the outflow had been regulated according to method B so as to secure the maximum possible increase in the ordinary seasonal low water flow by means of a maximum range of 5 feet in the level of the lake and with 100 billion cubic feet of total storage capacity on the Upper Rainy reservoirs, under those conditions 14,742 cubic feet per second would have been available over that same period of time; and that that represents an increase of 5½ per cent in the utilizable outflow under those conditions, but it is not by any means a full measure of the advantage of various systems of regulation to power development.

I would like to leave it right there, if I may, and while I am on my feet I would also like to refer to the statement that the level of the lake would have risen above 1,057 only occasionally. According to plate 125, the level of the lake, under natural conditions, according to our computations, would have been above 1,057 just half of the time.

Mr. BERKMAN. How much of the time during the last nine years would the lake have been above 1,057 for any considerable period of time; that is, a month or so?

Mr. MEYER. Without desiring to get into a discussion of matters that were not before us at the time, I would say that it appears that in 1908 the level would have exceeded 1,057, and apparently that it would not have exceeded 1,057 since then or up to the end of 1913. The computations here are not complete for 1915, but I would like to say that it is not advisable in considering matters of this kind to base conclusions on a relatively few years' records when we all know that natural phenomena occur in more or less cycles covering a large number of years; that is, covering a period of 25 or 30 or possibly 50 years, and that it would be only fair to say that while it is true that during those years from 1909 on the level under natural conditions would not have reached 1,057, it would have exceeded 1,057 in 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, and 1908. If we look at just this little period of years that constitutes an extreme dry spell, it is true that

the level would not have risen above 1,057, but it would not be fair to base conclusions as to what is going to occur in the future upon what has occurred in the past.

Mr. BERKMAN. My question did not take into consideration a long period of time; it was put only to Mr. Deacon upon the last 9 or 10 years, and I think you will agree with me, Mr. Meyer, that in these last 9 or 10 years the year that it did exceed 1,057 it did not exceed 1,058.

Mr. MEYER. Well, Mr. Chairman, I think that perhaps some conclusion ought to be reached as to what the position of the engineers is to be during the investigation. Of course, it is very difficult for us to sit still in our chairs when things are going on on the floor that will lead—not at all intentionally, but entirely unintentionally—to misunderstanding and misapprehension of portions of the report, for you are all aiming, after all, to get at the real facts that underlie the most advantageous use of these waters. From that viewpoint it would seem desirable that we should occasionally have the privilege of interposing a remark. I am perfectly willing to keep still until I am called upon to make a statement, and I answered that question as frankly as I could without wanting it to appear that I was going out of my way to state other things that should be taken into consideration at the same time. I would like to have some ruling made as to what the position of the engineers is to be during the hearings, so we may be advised as to what action to take.

Mr. MAGRATH. I think that when the engineers desire to make an explanatory remark they should certainly have the privilege of doing so. Mr. Berkman asked you a question, Mr. Meyer, as to the levels within a certain period of time, and it is for you to say yes or no to the question that he put.

Mr. GLENN. Mr. Chairman, when the witness makes a statement, however, any interest should have a right to cross-examine him or ask questions about it.

Mr. WYVELL. I would like the right, if I may be permitted, to ask Mr. Meyer one or two questions along the line of what he brought out himself.

Mr. TAWNEY. Mr. Chairman, would it not be well to go on with the testimony of these property owners now? Mr. Meyer will make his statement on the whole proposition after they get through with this other testimony. It was only the remark that was made here in regard to the  $5\frac{1}{2}$  per cent increased benefit to the power interests that I asked Mr. Meyer to correct, because the witness was voluntarily drawing inferences out of the report of the engineers that were susceptible of being misinterpreted, and those inferences were going into the record.

Mr. WYVELL. It is along that line that I want to ask a question. Mr. Meyer, if I understand your report correctly, and I have read it very carefully, under plan A more water is wasted than under plan B. More water runs that is not utilized, we will say.

Mr. MEYER. That is correct.

Mr. WYVELL. Therefore, assuming that plan A was put in force, how much increase in utilizable flow would result over natural conditions?

Mr. MIGNAULT. Mr. Wyvell, it strikes me that that is irrelevant under the order of procedure which we fixed this morning. We were



to hear persons interested in summer resorts on the Lake of the Woods. The question which you put is a question which will be very material when Mr. Meyer makes his statement as to the power interests, but it is absolutely immaterial on the very point which the commission is now considering, namely, the interests of the campers and the interests of people owning islands and having summer residences.

Mr. WYVELL. Mr. Mignault, it appears that the witness had not read this report, not having had the opportunity, and if other witnesses are to follow I think, with regard to this particular inquiry, it may be well that they know also the facts relative to the increase in utilizable flow. I did not ask that the remark be extended. Mr. Meyer could have explained any statement that I may have misquoted just as well at some other time as now, but now that he is on his feet to make a statement I would ask leave of the chairman to press this one question.

Mr. MIGNAULT. Ask this one question and then we will go on.

Mr. MEYER. To answer the question specifically, under method A and all assumptions that go with it as herein stated, there would be less utilizable flow than in a state of nature.

Mr. TAYLOR. Mr. Chairman, Mr. Deacon has given you evidence generally covering what will happen if a very high level is maintained. To support his testimony I want to call a few witnesses who will speak with more particular reference as to how they will be effected themselves.

Mr. DEACON. I just want to make one more statement. Mr. Keefer asked me whether I said I agreed with Mr. Mather's evidence in Kenora, and I said I agreed generally, but with regard to Mr. Mather's statement about 1,062.8, I had no notes of what Mr. Mather said. I agreed, speaking generally, and I do not think I ever said 1,062.8.

#### TESTIMONY OF MR. ARTHUR CONGDON, OF WINNIPEG, CANADA.

ARTHUR CONGDON, being first duly sworn, testified as follows:

Mr. TAYLOR. Mr. Congdon, you are a resident of the city of Winnipeg?

Mr. CONGDON. I am.

Mr. TAYLOR. What is your business here?

Mr. CONGDON. Wholesale boot and shoe business.

Mr. TAYLOR. You have been a resident of the city of Winnipeg for a number of years?

Mr. CONGDON. Thirty or thirty-four years.

Mr. TAYLOR. You also have a summer home on the Lake of the Woods?

Mr. CONGDON. I have.

Mr. TAYLOR. How long have you been going down there to your summer home?

Mr. CONGDON. Last year was the twenty-third summer.

Mr. TAYLOR. Will you speak as to the damage that you are likely to sustain in case the water is maintained at the very high level that has been suggested?

Mr. MAGRATH. What level are you speaking of now?

Mr. TAYLOR. 1,062 has been suggested as the maximum level to be aimed at. It is the suggested level to which I refer.

Mr. CONGDON. Such a level would inflict very serious injury upon my property. I might perhaps just explain that very briefly in my own words. I am located on Keewatin Beach. The public highway runs immediately behind my house. There are about 15 feet between the house and the fence. The house is located on the side of a sharp decline. From the foot of the front steps to the margin of the lake, to the bank, it is practically level; that is, the lawn is practically level.

Mr. MAGRATH. What is the distance between the two?

Mr. CONGDON. The distance, I fancy, would be about 60 feet from the bottom of the front steps to the bank. With high water some years ago I lost about 15 feet of my bank by the encroaching of the high water at that time. It ate away the bank. The bank is not rock. I then constructed a stone wall, which prevented further loss of bank. If the level was fixed higher than the high-water of last year, this frontage would be, I think, covered; that is, if it were at the point suggested, 1,062, I think it would be entirely covered. Even at a somewhat lower level, what you call the seepage would make the ground in front like a wet sponge continually, which would destroy it.

Mr. MAGRATH. What is the level of the ground at your front porch?

Mr. CONGDON. The height?

Mr. MAGRATH. Yes.

Mr. CONGDON. Well, I do not know that.

Mr. MAGRATH. How high above the lake is it?

Mr. CONGDON. Above the high-water mark of last year? I fancy it would be between, possibly, a foot and 18 inches.

Mr. ANDERSON. Do you mean the high-water mark of last year, Mr. Congdon?

Mr. CONGDON. The high-water mark of last year; yes, sir.

Mr. MAGRATH. Can you say how much higher than that?

Mr. CONGDON. About 18 inches, but at the lake it is not so high. There is a slight slope. Now, sometime ago I had an idea of removing from the beach, and for that reason I purchased an island about 3 miles back on the lake, one that attracted me very much on account of the possibilities of development. It could be made a very attractive and beautiful place for the reason that it consisted of one small island fairly high and rocky and two peninsulas, which at the high water of last year became islands. One peninsula is lower than the other. That was practically submerged, and the other was for all purposes of utility submerged. If the water were raised higher that would all be destroyed and the property would be practically valueless. There are two bays with sandy beaches, which are, of course, flooded and which would be badly flooded.

I have been asked to give my evidence purely from the standpoint of my personal experience, and I have so given it. I might say this, that, of course, I have not developed that property for reasons of this commission. I put a small building on the property but have not further developed it, and will not, of course, until I find out what is going to happen.



Mr. POWELL. Would you be satisfied with the level that obtained last year, or would you wish it lower?

Mr. CONGDON. As far as any effect on my own personal property is concerned it would be better lower, but I would be quite satisfied with the level that obtained in September of last year.

Mr. POWELL. 1,060.8?

Mr. CONGDON. Yes; but still I would not ask for that. I would not feel justified even in asking for any compensation if the level were put at the height suggested by Mr. Deacon. All I would want would be that I might consider practicable and reasonable.

Mr. KEEFER. What would the height be as suggested by Mr. Deacon?

Mr. CONGDON. Did he not say 1,061?

Mr. TAWNEY. Yes; 1,061.

Mr. CONGDON. That would be 6 inches higher than the petition asks for.

Mr. KEEFER. May I ask, Mr. Congdon, when you were talking about the maximum high level of 1,062.5, how long you were considering that the water was going to be there and how frequently? First of all, how frequently do you expect that will be the maximum high range?

Mr. CONGDON. 1,062.8?

Mr. KEEFER. If that were fixed as the high level range, would you expect it to be there every year?

Mr. CONGDON. Was that the suggestion?

Mr. KEEFER. No; that is not the suggestion. I want to see what is in your mind in giving your testimony. That is the maximum high range.

Mr. CONGDON. 1,062.8?

Mr. KEEFER. Whatever is recommended. Take the maximum. You must have a variation in the lake and that variation will change from time to time; 1,062.8 is the high-water mark, is it not—the Kennedy mark? You are familiar with it?

Mr. CONGDON. No; I am not familiar with it.

Mr. KEEFER. Well, you have been there for twenty-some years.

Mr. CONGDON. But I am not familiar with it.

Mr. KEEFER. Well, that happens to be the Kennedy high-water mark. You have only seen it come up to that a few times during your experience?

Mr. CONGDON. Well, I have never taken measurements, but my recollection is that in the years I have been going down there I have rarely, if ever, seen it higher than it was last year.

Mr. KEEFER. Well, some of the other witnesses have told us—I was quoting from Mr. Mather's evidence—that they have frequently seen it at the lower of the two high-water marks, which was 1,062.8. You do not recall that fact?

Mr. CONGDON. No.

Mr. KEEFER. If occasionally the water in order to serve the best interests had to go up to this maximum, instead of being there all the time, would that vary your evidence at all?

Mr. CONGDON. It could not vary my evidence which is based on physical facts.

Mr. KEEFER. Well, based on physical facts, the water has been up to that point.

Mr. CONGDON. Not to my observation.

Mr. KEEFER. Well, the engineers have reported that and we shall have to take their data on that point. The island that you speak of and that you acquired here recently you are contemplating building on?

Mr. CONGDON. That is my purpose; yes, sir.

Mr. KEEFER. What did you pay for it?

Mr. CONGDON. I bought it a number of years ago. I paid \$1,500 for it at that time.

Mr. KEEFER. And it would be damaged to some extent if the water were put to 1,062.8?

Mr. CONGDON. Well, I am not at the moment considering the question of indemnity. That is not the purpose at all.

Mr. KEEFER. I know you are not; but we have to get at this question, and if anybody is damnified they will have to be compensated. The commission want to know that. Would your island that you have purchased be damnified if the level were put up to 1,062.8?

Mr. CONGDON. I did not get the word.

Mr. KEEFER. Would it be damaged?

Mr. CONGDON. Decidedly.

Mr. KEEFER. How much?

Mr. CONGDON. I could not say that offhand.

Mr. KEEFER. Half the value of the whole island?

Mr. CONGDON. Well, it would be useless to me for my purposes.

Mr. KEEFER. We will say the total value of the island.

Mr. TAYLOR. I have been informed that some of the interests are likely to ask for a maximum of 1,062.5 instead of 1,062 as suggested. I presume that would do you much more serious injury than you have spoken of in connection with the level of 1,062?

Mr. CONGDON. I could not answer that exactly because if a thing is destroyed a little more does not make it more destroyed.

Mr. KEEFER. How many islands are there in the lake?

Mr. CONGDON. Well, you have asked me something that is beyond me.

Mr. KEEFER. Over 10,000, I suppose?

Mr. CONGDON. I think you know more about that than I do.

Mr. KEEFER. Are half of them patented yet?

Mr. CONGDON. I have not the slightest idea. I am not interested in that.

Mr. TAWNEY. Do you mean to say that if the maximum of the range that should be recommended and should be established by the two Governments is 1,061.5 or 1,062 that your island would be entirely destroyed for purposes for which you purchased it?

Mr. CONGDON. For my purposes; yes.

Mr. TAWNEY. How high above the level of the lake is the highest point on the island?

Mr. CONGDON. One island is very small. That is the rocky one.

Mr. TAWNEY. About how small? What is the area of it, an acre or two acres?

Mr. CONGDON. You might say possibly about an acre.

Mr. TAWNEY. How high is the highest point on that island above the level of the lake?

Mr. CONGDON. The whole property, according to the surveyor's statement, was under 3 acres. Of course, they make some allow-



ance in the measurements of the shore line; I do not know what. I guess the area of all the land would be something more than that if you measured it to the water's edge at normal times, but you see these other places would be flooded and useless. They would not be capable of development.

Mr. TAWNEY. You have not answered my question. How high is the highest point on the island above the level of the lake?

Mr. CONGDON. I do not know. It is quite high. I fancy the highest point would be 15 feet.

Mr. TAWNEY. Does it rise gradually from the water right up to the center?

Mr. CONGDON. Gradually; yes, sir.

Mr. TAWNEY. So the island would not be destroyed if it were raised 2 feet? It would not be overflowed, I mean.

Mr. CONGDON. The large island?

Mr. TAWNEY. Any of them.

Mr. CONGDON. Yes; the smaller one would be.

Mr. TAWNEY. Which contains about half an acre?

Mr. CONGDON. There are two smaller ones. One would be entirely covered and the other would be covered with the exception of room enough upon which to stand. You could not build a house there. It would be of no value at all.

Mr. MIGNAULT. I suppose, then, it is one of the low islands which you purchased?

Mr. CONGDON. Well, I have described the island. Of course, the small one is fairly high in the center.

Mr. MIGNAULT. Can you recollect in what year you purchased it?

Mr. CONGDON. I fancy it was about four years ago; something like that.

Mr. MIGNAULT. That would be, then, about 1912.

Mr. CONGDON. I think it was in 1912.

Mr. MIGNAULT. Do you remember in what month you purchased it?

Mr. CONGDON. Yes; I fancy it was in August.

Mr. POWELL. I suppose the situation is this: There were certain physical features about that island that appealed to you and on the strength of that you bought it.

Mr. CONGDON. Precisely.

Mr. POWELL. And the increase in the level of the lake would destroy the attractiveness of the island to you and you would prefer to move?

Mr. CONGDON. Absolutely.

Mr. ANDERSON. Of course, Mr. Congdon is not on that island. That is only an island that he bought.

Mr. CONGDON. The evidence that I had intended to move on it is the fact that I have already erected a small house there, to use in the meantime for purpose of refuge during the time of development and building, etc.

Mr. POWELL. That is the sentimental reason. Somebody else, unattracted by those physical features, might give as much for the remainder as you gave for the whole. So from the monetary standpoint you are not losing very much, but from the sentimental standpoint you are losing a good deal.

Mr. CONGDON. That is a matter that would have to be determined.

Mr. MAGRATH. I can not quite understand how in a piece of property, say, containing 1 acre the entire value of that property would be destroyed by a change in level of the water of, say, a foot.

Mr. CONGDON. I said the value from my standpoint. The island would not be used by me.

Mr. MAGRATH. To what extent would the water encroach on your island by that foot in elevation.

Mr. CONGDON. The high level of last year made things very serious, so far as that was concerned, and anything higher would make it very much worse.

Mr. ANDERSON. Do you understand that that maximum high level that is suggested would be maintained all the time, or do you understand that it may occur only once in 25 years?

Mr. CONGDON. I anticipate that that will be maintained in so far as is possible, and I would also anticipate that at certain times it would be considerably exceeded.

Mr. ANDERSON. But if you were told that that was the maximum which was to be allowed, and that that maximum would only obtain perhaps once in 25 years, would that alter your position? In this suggestion of regulation the range is going to fluctuate and change. It is not the intention to maintain the water at that level by any means. That is the highest maximum range that will maintain at any time, and then that will only be once in 25 years. Would that change your attitude?

Mr. CONGDON. That property has a lot of arable land on it. It is not rock. The high water would naturally wash that away. It would destroy the trees.

Mr. ANDERSON. That is, if the high water came once in 25 years?

Mr. CONGDON. Do you mean 1,062?

Mr. ANDERSON. 1,062.5.

Mr. CONGDON. Once in 25 years?

Mr. ANDERSON. Yes.

Mr. CONGDON. It would be inconvenient at the time, but we would recover from that. Is that the intention?

Mr. ANDERSON. That is what it really amounts to, as I understand it.

Mr. TAYLOR. Will you give a guarantee as to that, Mr. Anderson?

Mr. ANDERSON. Ask some of the engineers about that. That is an engineering question; but that is the way I understand it.

#### TESTIMONY OF MR. W. H. GARDNER, OF WINNIPEG, CANADA.

W. H. GARDNER, after being first duly sworn, testified as follows:

Mr. TAYLOR. You have been a resident of the city of Winnipeg for a number of years, Mr. Gardner?

Mr. GARDNER. About 20 years.

Mr. TAYLOR. You are a real-estate broker by occupation?

Mr. GARDNER. Yes, sir.

Mr. TAYLOR. You are also a property holder on the Lake of the Woods?

Mr. GARDNER. Yes.

Mr. TAYLOR. Will you just tell us about how you would be affected by a maximum level of, say, 1,062.5?



Mr. GARDNER. I have an island down there, and I built on a particular location because of two advantages—one a beautiful beach for my children and the other some naturally beautiful trees. If the water is raised to the height suggested, it is my opinion that I will lose my beach, I will lose my trees, and, in addition to that, because of the wash of the water on the soil, if those trees come down, it is extremely likely that my house may be brought into a very dangerous position. Some of those trees are very big, and they are located about 30 feet from the house, perhaps 40 feet. The house is only about 12 feet above the water level. The water last year was already washing into the roots of those trees. If they come down with a run, the chances are they will break off my bank mighty near to the house. On the other side of the island I have my boathouse, and with the high water last year—well, the boat had to stay outside, because it was too high to permit of the launch getting in. It was one of these covered launches.

Mr. TAWNEY. Mr. Gardner, you are testifying now upon the assumption that this would be the effect upon your property if that level were raised a foot above what it was last year and maintained there permanently, are you not?

Mr. GARDNER. Yes.

Mr. TAWNEY. Otherwise, the water would not destroy your trees?

Mr. GARDNER. Yes; it would.

Mr. TAWNEY. If the water did not remain there permanently?

Mr. GARDNER. It would just depend on the length of time, sir. I would be very much scared to have the water washing at those roots much longer. I know what it was doing at last year's level. You raise it another foot, and I am not prepared to tell you what is going to happen.

Mr. TAWNEY. How long did the water remain at 1,061.5 last year?

Mr. GARDNER. Possibly three weeks, I should think.

Mr. TAWNEY. How long have you had that lot?

Mr. GARDNER. Several years.

Mr. TAWNEY. That was the first time in how many years that it raised as high as it was last year?

Mr. GARDNER. Since I have owned the island it would be some four years, I think, sir.

Mr. TAWNEY. You do not know how many years prior to the time that you owned the island it has been since the water was up as high as it was last year?

Mr. GARDNER. No; I only know that the beauty of the beach and the trees and the slanting rocks out beyond those trees attracted me to that place as a camping place for years until I had money enough to buy it.

Mr. TAWNEY. And the water remained stationary for about three weeks last year at 1,061.5?

Mr. GARDNER. I do not know as to that, but I should think approximately that, sir.

Mr. TAWNEY. And that was the only time during all the time you have owned the island that it came to that point?

Mr. GARDNER. To the best of my knowledge.

Mr. MIGNAULT. You are satisfied with the level as it was in the month of September of last year?

Mr. GARDNER. Yes, sir.

Mr. ANDERSON. Mr. Gardner, you are known as a public-minded citizen of Winnipeg. You appreciate the benefit that Winnipeg has derived from the utilization of the power on the Winnipeg River, do you not?

Mr. GARDNER. Yes, sir.

Mr. ANDERSON. And I presume that you can appreciate the benefits that are to accrue from the use of the ultimate power available there?

Mr. GARDNER. Yes, sir.

Mr. ANDERSON. I also assume that you, like no doubt the rest of the gentlemen who represent the camping delegation, would take this position, that if in order to utilize the waters of the Winnipeg River to their utmost capacity and thereby benefit the city of Winnipeg it resulted in some damage to you, you would take the damage and say nothing about it?

Mr. GARDNER. Yes. All I want to know is to be dead sure that you have got to damage my property, and that there is not some other method of meeting the difficulty.

Mr. ANDERSON. That is a reasonable position to take.

Mr. POWELL. Would an increase in the level of a foot or so be a benefit to the islands, so far as their accessibility is concerned?

Mr. GARDNER. I do not think so.

Mr. POWELL. It would not improve the motor-boat navigation?

Mr. GARDNER. No, sir.

Mr. BERKMAN. Mr. Gardner, the beaches are a nice advantage for men who have families and children; that is, the beaches around the islands?

Mr. GARDNER. Yes, sir.

Mr. BERKMAN. They are an advantage in the way of bathing and learning to swim, etc. That is, it is considerable of an advantage in those respects?

Mr. GARDNER. Yes, sir.

Mr. LAIRD. Mr. Gardner, do you know about a Government reservation that is around your island?

Mr. GARDNER. Mr. Laird, I bought the island from Mr. Munson, and I think Mr. Munson fixed it so there was no Government reservation.

Mr. LAIRD. Is it not a fact that there is a Government reservation around a great many of them?

Mr. GARDNER. Yes, sir.

Mr. LAIRD. Do you know the width of that reservation?

Mr. GARDNER. I believe it is 100 feet.

Mr. LAIRD. So, if there is a Government reservation on many of the islands the question of damage to the property owners would be eliminated?

Mr. GARDNER. I do not think so. I do not know much about it, but I believe that the Government reservation is very largely a technical thing in connection with the lumber interests.

Mr. TAYLOR. It does not affect the camper in any way?

Mr. GARDNER. I do not know enough about it.



**TESTIMONY OF DR. J. K. BARRETT, OF WINNIPEG, CANADA.**

Dr. J. K. BARRETT, having been duly sworn, testified as follows:

Mr. TAYLOR. You are a resident of the city of Winnipeg and a property holder here?

Dr. BARRETT. Yes, sir.

Mr. TAYLOR. You are also a property holder on the Lake of the Woods?

Dr. BARRETT. Yes, sir.

Mr. TAYLOR. Will you tell the commission just how the proposed high level would affect you?

Mr. TAWNEY. Just one minute, please. I do not know of any proposed high level. State some specific level. The commission has not proposed any level.

Mr. TAYLOR. I will make it definite and say 1,062.5.

Dr. BARRETT. The high level of last year, whatever it was, very seriously affected my property.

Mr. MIGNAULT. In what month?

Dr. BARRETT. I might say for the whole of July and about the first week of August, and then the water began receding. I own property on a sandy beach on the south side of Coney Island, about 600 feet, and I had a beautiful beach there. I was compelled, on account of the rise of the water, to expend some money on my boathouse—a couple of hundred dollars or \$250—so that I could get out to the boathouse. However, that is neither here nor there. I am not complaining about the money I had to spend in fixing the boathouse, but I am complaining very seriously about the damage that was done to my beach. I had a nice lawn there sloping down to a sandy beach, nicely treed, and last year it washed away about 8 feet of my beach and destroyed a lot of my trees, and if the same height of water ever occurs again I will simply have to build a breakwater there to save my property. It has taken away about 15 feet of my beach now, and it is only about 25 feet from there, on a level, too, up to the veranda of my cottage. Even though I build a breakwater there at a very heavy expense to myself it is going to be an unsightly thing. In fact, the beauty of my beach is destroyed now and many of my trees have been undermined by the wash of the water and have fallen into the water. I consider that it has done my property very serious damage.

Mr. GARDNER. You are speaking now with reference to the year 1915, are you not?

Dr. BARRETT. 1915; yes, sir. Of course, there was once or twice before when a heavy wind blowing in from the south washed the water right up to the edge of my beach and washed away a little of the beach, but it was nothing very serious. However, last year was the limit. It would cost me a thousand dollars to build a breakwater there. My property would be useless if the water should go that high again. It would be absolutely necessary to put that breakwater there or lose my property altogether, because if it washed away 8 feet last year it would be just as likely to wash 4 or 5 feet away this year, and I would be forced to protect myself against that by building the breakwater.

Mr. MACRATH. What is the area of the island?

Dr. BARRETT. It is a very large island. There are over 40 cottages on the island now. The north side of the island faces Kenora, and I am on the south side of it.

Mr. MACRATH. What water frontage have you?

Dr. BARRETT. About 600 feet.

Mr. KEEFER. What is the width of the beach, Doctor; that is, from the water's edge up to the edge of the beach?

Dr. BARRETT. Last year when the water went down in September we had about 6 feet of beach.

Mr. KEEFER. How far had the water gone down then?

Dr. BARRETT. I really could not say.

Mr. KEEFER. A foot?

Dr. BARRETT. It must have been over a foot.

Mr. KEEFER. It must have receded over a foot and left you 6 or 8 feet of beach?

Dr. BARRETT. Yes; it left me 6 or 8 feet of beach.

Mr. KEEFER. Do you know whether that island has not along the shore of it reserved to the Government 1 chain allowance?

Dr. BARRETT. I really do not know, I am sure.

Mr. KEEFER. You do not know where your land begins according to your title, as a matter of fact, do you?

Dr. BARRETT. The title says it begins at the water's edge.

Mr. KEEFER. What water's edge?

Dr. BARRETT. The edge of the water, where the water comes up.

Mr. KEEFER. Well, high or low, or what?

Dr. BARRETT. I do not know. I never looked into that.

Mr. KEEFER. You do not know whether there is a reservation there of 1 chain allowance or not. How long ago did you receive your patent? Did you get it directly from the Government?

Dr. BARRETT. No; I bought it from a resident of Kenora.

Mr. KEEFER. Do you know when it was deeded by the Government?

Dr. BARRETT. I do not know; but I know I bought it in 1894.

Mr. KEEFER. The name of the island is what?

Dr. BARRETT. The name is Coney Island, and it is on the south side.

Mr. ANDERSON. How long have you occupied that, Dr. Barrett?

Dr. BARRETT. Since 1894.

Mr. ANDERSON. How many times during that period has the water been as high as it was last summer?

Dr. BARRETT. I do not remember of its ever being as high as that.

Mr. ANDERSON. You would not like to say that it had not, would you?

Dr. BARRETT. No.

Mr. ANDERSON. Because I hold in my hand a chart which indicates a number of years in which there was pretty high water. For instance, how high was the water in 1914 as compared with last year? I mean the highest point.

Dr. BARRETT. It was pretty high last year when I was down there.

Mr. ANDERSON. I mean in 1914.

Dr. BARRETT. The water was pretty high.

Mr. ANDERSON. It was nearly 1,061.5, according to this chart.



Dr. BARRETT. I think it dropped earlier in the season and I did not notice it so much and it did not do so much damage to my property as last year.

Mr. ANDERSON. At what time was the highest water last year?

Dr. BARRETT. I do not know. I went down there about the 20th of June and it was pretty high then.

Mr. ANDERSON. Do you remember that in 1910 the water was high?

Dr. BARRETT. I know it varied very much. I know that one time the water was so low I had a beach of 30 or 40 feet.

Mr. ANDERSON. Then there has been a great variation in levels?

Dr. BARRETT. Yes.

Mr. ANDERSON. I am speaking about the high ones and you are speaking about the low ones. According to this chart here, in 1907 the water went up above 1,062. Were you referring to the year 1907, the year of high water?

Dr. BARRETT. I can not just charge my memory with that, but I know that on few occasions the water varied considerably.

Mr. ANDERSON. The level does vary from year to year according to the flood conditions.

Dr. BARRETT. Yes. Last year my attention was particularly called to it because of the damage it did my property. Previously it did not seem to do so much damage.

#### TESTIMONY OF MR. W. P. MOSS, OF WINNIPEG, CANADA.

W. P. MOSS, being first duly sworn, testified as follows:

Mr. TAYLOR. You are a resident of and a property holder in the city of Winnipeg?

Mr. MOSS. I am.

Mr. TAYLOR. And also at Kenora on the Lake of the Woods?

Mr. MOSS. Yes.

Mr. TAYLOR. What is your business here?

Mr. MOSS. Merchant.

Mr. TAYLOR. Will you tell the commission, as the former witnesses have done, how a level of, say, 1,062 or 1,062.5 would affect your property?

Mr. KEEFER. An ordinary level or a maximum level?

Mr. TAYLOR. A maximum level.

Mr. MOSS. A level of 1,062.5 would destroy a beach of about 100 feet and would necessitate the raising of my boathouse and my pump house entirely. Probably the boathouse would have to be torn down. It is a big boathouse. Also, the water would seep back and, I suppose, make it marshy for 15 or 20 feet back of the beach. The beach slopes back pretty gradually.

The level of 1,060.5 is very comfortable. Even 1,061 would be all right for me.

Mr. MAGRATH. What effect upon your beach would the difference between the two levels, 1,061 and 1,062.5, have?

Mr. MOSS. It would practically do away with my beach. It would come up into the margin of the trees and into the black soil and destroy its usefulness altogether.

Mr. ANDERSON. You would not have any objection to the water remaining at 1,061 all the time? Is that what you mean?

Mr. MOSS. What was it last year—1,060.57?

Mr. ANDERSON. Yes; I believe so.

Mr. MOSS. I could stand it from that up to 1,061.

Mr. KEEFER. If it went to 1,062.5 only occasionally in a cycle of years, how would it affect you?

Mr. MOSS. Well, it would affect me for the time. Just as I say, it would destroy the beach for that time. I suppose the beach might come back. It would put the boathouse out of commission absolutely, and if we knew what the cycle of years was going to be——

Mr. KEEFER. But it would not be there all the time.

Mr. MOSS. It would only be a temporary inconvenience if it were up there once in 25 years.

#### TESTIMONY OF MR. E. L. DREURY, OF WINNIPEG, CANADA.

E. L. DREURY, having been duly sworn, testified as follows:

Mr. TAYLOR. You are a resident of the city of Winnipeg?

Mr. DREURY. Yes.

Mr. TAYLOR. And a business man here?

Mr. DREURY. Yes.

Mr. TAYLOR. And you also have a summer home on the Lake of the Woods?

Mr. DREURY. I have.

Mr. TAYLOR. What have you to say as to the maximum level of 1,062 or 1,062.5? How will it affect your property?

Mr. DREURY. Of course, I have not the technical knowledge as to what 1,062 means, but I know how it affected me last year. I know that in June one of my boathouses was badly flooded; and some of my docks, a retaining wall 100 feet long, which I have erected and filled in behind with sand brought there by barges—the water overflowed that; and the beach that I had constructed for my children and grandchildren—principally the latter—that was badly flooded, and, therefore, if 1,062 stood for any higher stage of water than that——

Mr. TAYLOR. It would be about 6 inches higher than the high stage of water last year?

Mr. DREURY. I would be decidedly opposed to it. However, I might say, as ex-Mayor Deacon has already said, we are citizens of Winnipeg, as well as campers of the Lake of the Woods. We do have a certain amount of patriotism. I for one would be very sorry indeed to take any stand that would be inimical to the interests of the city, but I do think, Mr. Chairman, that the Almighty never put all those beautiful little sand beaches there and those charming coves in those islands except from a human point of view. There is the commercial side and also the human side, and I think that should be our object in bringing this matter before you. You are going to be the ultimate judges, and when certain interests say, "We want 1062 or 1063," or whatever they want, you will be able to know that there are a certain number who are anxious to go out there, take their children and grandchildren and bring them up, and that there is that human side; and then it will be for you to ask these men, "Now, can you not bring it down a little? Can we not compromise? Can we not meet on common ground?" And that is my whole object in coming here this



afternoon. The amount of injury to my place would be, I consider, a mere bagatelle. It could be arrived at in dollars and cents, probably, because I can build another beach; I could build another retaining wall; but there are natural beaches there that I think would be absolutely, obviously, destroyed, and they must, as I said before, have been put there for some very good object.

### TESTIMONY OF MR. H. R. HADCOCK, OF THE CITY OF WINNIPEG.

H. R. HADCOCK, having been duly sworn, testified as follows:

MR. TAYLOR. You are the manager of the Y. M. C. A. here, or is that the term you use?

MR. HADCOCK. We use the term secretary.

MR. TAYLOR. And you know the properties which the association owns on the Lake of the Woods?

MR. HADCOCK. Yes.

MR. TAYLOR. What are those properties?

MR. HADCOCK. We have five islands, one rather a large island and the others are on each side, one practically on each side of it; the center one is the one we use mainly.

MR. TAYLOR. About how many years has the association been using these islands?

MR. HADCOCK. It must be 20 or 25 years.

MR. TAYLOR. How do you make use of the islands?

MR. HADCOCK. We use them as a camping headquarters for our summer camps.

MR. TAYLOR. And about how many young men do you take down there in the course of a summer?

MR. HADCOCK. Our maximum has run about as high as 250; last year it was less than that. We have run a mixed camp part of the time; last year it was a straight men's camp, and in addition to that we have perhaps 200 boys go down there.

MR. TAYLOR. In addition to the men?

MR. HADCOCK. Yes.

MR. TAYLOR. What recreations do they have down there?

MR. HADCOCK. Well, we have baseball and basket ball and volley ball; those are the games that are possible on a limited area on the land.

MR. TAYLOR. What are the beaches round your islands?

MR. HADCOCK. We think we have about as fine a beach as there is on the Lake of the Woods, running from the main island to an adjacent island, the Patton Island; there is a bar running clear across there between those two islands; and adjacent to that, running along the main line, for a little piece, is a continuation of this; that is the main swimming place.

MR. TAYLOR. Are the beaches much used by the men and boys?

MR. HADCOCK. Oh, yes; one of the most attractive features of the island.

MR. TAYLOR. How would those beaches and islands be affected by a level such as we have been speaking of, of 1,062 or 1,062½?

MR. HADCOCK. That high-water mark would practically eliminate the sand beach entirely. It would cease to be a sand beach, only as

being near the water. Where we use the shore now as a bathing beach, we would have to build an artificial beach; we would have to build a platform of some kind.

Mr. TAYLOR. Are there any facts in connection with the matter that you wish to state?

Mr. HADCOCK. I would like to draw attention to one that might be overlooked; that is, the space question, in regard to the place we have cleared, known as the athletic field. That is a term that is very general; that, with high water, is constantly eaten away. During the high waters we have lost a good deal of that beach, as others have lost it, and if the water is put up, as you suggest, there will be a very definite result on that beach. We will lose it, I presume, at the rate of about 10 or 15 feet a year, if the weather is as it has been two or three years recently, particularly in this high water. We have drawn some stones in there to protect that as a precaution, but the high water is above those stones. That, and the thing that I have stated in regard to the sand beach, and the general submerging of the lower parts of the island, would be things we would have to contend with all the way through.

Mr. TAYLOR. Your large island is a comparatively low lying island?

Mr. HADCOCK. Yes. The athletic field is practically level and would not be very much above the high-water mark, as suggested, particularly parts of it.

Mr. CAMPBELL. You say not very much above that mark; how much above?

Mr. HADCOCK. Part of that would be submerged.

Mr. CAMPBELL. How much?

Mr. HADCOCK. That place, I presume, is 150 feet across it. The one corner where we start our games, where we have our incinerator, that would perhaps mean a tenth of that; we would have a sink hole there; that would be underneath; there would be water running into that point.

Mr. CAMPBELL. Would it be hard to fill that up to that corner?

Mr. HADCOCK. Well, we have thought of that for 10 years at least, and have never succeeded in doing anything with it; that is all I can say.

Mr. CAMPBELL. Have you attempted it seriously?

Mr. HADCOCK. Well, that is all I can say. We have not seen any feasible way of doing it; that is all I can say.

Mr. CAMPBELL. You do not know whether it would be impossible, or whether it would be merely a matter of dollars and cents?

Mr. HADCOCK. I presume that would be the case.

Mr. CAMPBELL. In regard to the sand beach, the sand beach under water for bathing and the sand beach when you come out?

Mr. HADCOCK. Yes.

Mr. CAMPBELL. The latter would be submerged with the water?

Mr. HADCOCK. Yes.

Mr. CAMPBELL. It would be all under water?

Mr. HADCOCK. Yes.

Mr. CAMPBELL. That would not affect the value of the under water beach?



MR. HADCOCK. The under-water beach, of course, is indefinite; we do not know how far that runs. The sand beach out of the water is the one that interests us.

MR. CAMPBELL. That would depend upon how far the bather would want to walk or swim?

MR. HADCOCK. That would depend upon how much sand beach he wanted out of the water.

MR. CAMPBELL. But that you can procure by platforms?

MR. HADCOCK. No; that we could not get it. It would be irretrievable. It would be impossible to substitute the sand beach.

MR. CAMPBELL. Quite a number use the beach for bathing?

MR. HADCOCK. I do not think that could be substituted.

MR. CAMPBELL. It would be much more valuable and pleasanter to have a frontage, but it would not destroy the value of the beach for bathing?

MR. HADCOCK. Yes; it would, unless you wanted to go out into the middle of the lake. That feature of the island would be destroyed. We could get on a platform and go out into the lake at any place. But the reason why we go out 8 miles to that island is because, in the first place, the people selected it on account of that beach.

MR. CAMPBELL. You think, in your case, money could not compensate for that?

MR. HADCOCK. No; this island was selected absolutely for that before my time; and, I think, they spent nearly a week visiting a great many islands, and this island was selected on account of the beach which was, at that time, a bar going across between two islands, which, I presume, was nearly 100 yards, and which is absolutely out of sight now, and the highest part of it now, with the high water, is absolutely submerged.

MR. POWELL. Would not the beach feature be for the protection of the feet of the bathers walking out? That is why they selected it, not on account of the character of the soil above the water, but under the water. Instead of having rocks to interfere with the feet of the bathers it is the most delightful thing in the world to have a sandy beach.

MR. HADCOCK. Yes; we have that; that goes out indefinitely; and at the same time we value this very extensive sand beach that we used to have which was used. There would be as many enjoying a bath in the sand as there would be in the water.

MR. POWELL. In all our sea-coast resorts, it is the level, safe footing for the bather, and not the footing above?

MR. HADCOCK. Don't you find as many in the sand as in the water? There is the fact I want to bring out, that we bathe in the sand, as it were.

MR. TAYLOR. And the beach under the water, I presume, is destroyed very much by raising the water; for boys who can not swim, it ceases to be of the same value?

MR. HADCOCK. Yes.

MR. TAYLOR. I will call Mr. Hart.

MR. POWELL. If we know that this evidence can not be controverted, what is the use of multiplying? Everyone knows this evidence to be true.

## TESTIMONY OF MR. W. T. HART.

W. T. HART, having been duly sworn, testified as follows:

Mr. TAYLOR. How large is the island which you represent?

Mr. HART. The M. L. A. camp, about 21 acres.

Mr. TAYLOR. What is its character?

Mr. HART. Camping ground very similar to the one mentioned by Mr. Hadeock. The island was secured by subscriptions of Methodists in the city and used as a camping ground for Methodist young people. There are others who go out who are not connected with any particular church. The island has been used for five years now, and during that time to my certain knowledge the water has been raised, and it has been necessary to raise the docks twice, if not three times, on account of the change in the water. Last year was the highest water I remember on the Lake of the Woods; and if it goes 6 inches higher than it did last year, that island is cut in two.

Mr. TAYLOR. Have you a photograph of it here?

Mr. HART. I have a photograph of it, which I produce.

Mr. POWELL. That is, 1,062 would put you out of business?

Mr. HART. If that is higher than last year, yes; it would cut that island in two and give us two islands instead of one. In fact, it was almost that way last year.

Mr. POWELL. You could build a nice little bridge across?

Mr. HART. From past experience, the bridge would be useless most of the time.

Mr. TAYLOR. The island is a comparatively low-lying place?

Mr. HART. The island, so far as a portion of it is concerned, is comparatively low, and most of the buildings are located on that arm which extends out there where most of the trees are. As a matter of fact, our building was in the water last year the most of the season.

Mr. TAYLOR. Would the high water affect some of the timber round the islands?

Mr. HART. Yes; it would. It would destroy two beaches and very large beaches. The wash cuts away the island quite a little, when it is high especially.

Mr. POWELL. Has the wind much wake at it?

Mr. HART. No; not very much. It is pretty well sheltered.

Mr. TAWNEY. How long is the season?

Mr. HART. Well, the camping season, so far as this institution is concerned, runs from about 66 to 75 days. It begins about the last week in June and ends about the first week in September.

Mr. TAWNEY. Governed somewhat by the opening and closing of the schools in Winnipeg?

Mr. HART. Yes; and also by the weather, but mostly by the schools.

Mr. TAWNEY. It is during school vacation?

Mr. HART. The camping vacation in this country is largely July and August. Last year when I went down in June it was over the docks, and it kept rising a little until it got halfway over that narrow stretch of land you see there.

Mr. TAWNEY. If the works calculated to raise the level of the lake, or the level of the lakes were under the control of a body entirely



independent of the water-power interests, who would endeavor to avoid any undue rise, would that make any difference to you on the lake?

Mr. HART. If we knew the water would not rise above a certain height, then in the future plans for this property we could go to work and work them out; but if you build a building, as we did two years ago, which was well put up on the land, and discover in 12 months' time it is well out in the lake it becomes a serious problem. If the water is to be raised again it seems the island is cut in two, and some provision will have to be made to go across by boat or otherwise; and if the water drops again, then we have buildings which were intended to be near the water which are well up on the land. There is the constant fluctuation which makes it a serious matter.

Mr. TAWNEY. If the regulation of the level of the lake were under the control of a board entirely independent of the owners of the power, do you think that would have any influence or be any benefit to the property owners?

Mr. HART. Do you mean by that that the water then would not be raised?

Mr. TAWNEY. The regulation of the levels; say a provision were made for a certain regulation of the levels—a maximum high and maximum low level.

Mr. HART. If it means that the lake would not be raised as high as it was last year, that would be perfectly satisfactory to us. We have no complaint to make so long as our property is not going to be cut in two; but if you are going to raise it 6 inches higher than it was last year it means the property is cut in two for all future time. I suppose, once that was done, we would have to take our medicine and accept it.

Mr. TAWNEY. Supposing in a state of nature you would have a higher level than you had last year, with no regulation at all, you would have a range of levels then much greater than the range which has been discussed here to-day?

Mr. HART. Answering your question, it is not so much the dropping of the water that bothers us as the raising of it.

Mr. TAWNEY. In a state of nature it would rise in cycles?

Mr. HART. In a state of nature we have never seen it where it would go over that amount. It has never gone over that piece of land.

Mr. TAWNEY. You have never seen it in a state of nature?

Mr. HART. I have seen it for 15 years, and never saw it go over that piece of land. I have never seen it as high as it was last year.

Mr. POWELL. When you speak of the high water last year, you mean the highest?

Mr. HART. Yes; I refer to the time along about the 1st of July, when it was at its maximum.

Mr. POWELL. Do you know the height that has been spoken of as 1,060.5?

Mr. HART. I do not know what that means, exactly, except as I see it in the lake.

Mr. TAYLOR. That was the height on the 1st of September last year.

Mr. POWELL. Would that suit you?

Mr. HART. The height on the 1st of September would be perfectly satisfactory to us.

Mr. POWELL. In addition to not having it go above that height, you want the range of levels to be as close as possible?

Mr. HART. If I may answer that question from the standpoint of a person camping on the lake, I do not think the question of the variation has much to do with it. For instance, you put a dock in there; it does not make much difference whether your dock is 18 inches out of the water or 3 feet. A reasonable fluctuation does not affect us at all.

Mr. POWELL. I understood you to say it made some difference whether your buildings were close to the water or away from it?

Mr. HART. That is true; that is not as serious as the other matter.

Mr. POWELL. To a person used to tidal waters, your statement about the little difference it makes in the matter of convenience of a foot or 18 inches in level, as far as the dock is concerned, would appeal to me very much. In all tidal waters there is a range from 3 or 4 feet to about 60 feet, as we have it in the Bay of Fundy.

Mr. HART. Yes.

Mr. ANDERSON. How long do you say you occupied that island?

Mr. HART. About five years.

Mr. ANDERSON. How long have you owned it?

Mr. HART. It was bought five years ago this summer.

Mr. ANDERSON. I thought you said something about 15 years?

Mr. HART. I have been there 15 years.

Mr. TAYLOR. How many people do you take down to the island?

Mr. HART. We have all the way from 600 to 800 people during the season.

Mr. TAYLOR. I do not propose to call any more witnesses, and, if you will permit me briefly to sum up the evidence, then we have finished.

I want to say, first, that we have not attempted to produce all the evidence that we can produce. We could go on indefinitely with witnesses who would state their situation to be practically the same as the witnesses who have appeared before you. Mr. Campbell asked Mr. Deacon how many islands and cottages would be affected in the lake. It is impossible, of course, for us to give evidence that would be satisfactory upon that point. It would take time and expense to ascertain how many islands there are in the northern end of the Lake of the Woods that would be similarly affected. The number, I am sure, must be very great. All that we are attempting to do is to place before you such facts as we can readily get, that may enable you to understand that there are interests here that ought to be considered when you are taking this whole problem into your consideration.

Mr. MIGNAULT. How many have you on your petition?

Mr. TAYLOR. There are 73, and some others have come in since that I have not attached to it.

Now, I want you to understand, in the next place, that all the men who have appeared before you as witnesses are also property owners in the city of Winnipeg. You will note that some of them are very largely interested in property in the city of Winnipeg. No one can be more deeply interested in the future development of the city than



many of the men who appeared before you to-day. I will select a few names from the petition, and you will see they are men who are very largely interested in the welfare and future development of the city of Winnipeg. We have Mr. J. T. Gordon, the cattleman; Mr. J. H. Ashdown, one of the largest wholesale merchants in the city; Mr. Bradburn; and so on. If you examine the names attached to this petition you will find they are men who are largely interested in property here and in the future development of the city.

Now, it is possible there may be some conflict between their interests as property holders in the city of Winnipeg and their interests as holders of camping property at the Lake of the Woods. We are not convinced that there is any conflict between these two interests. We desire to place before you the interests of those men as campers on the Lake of the Woods, and trust that when you have considered the whole problem there may be some way in which it can be solved without doing serious injury to the interests of the Lake of the Woods. I think I may safely say, along with the witnesses, that we are not antagonistic at all to the power of the city of Winnipeg; we are not antagonistic to the power of any other corporation that is serving the people of the city of Winnipeg. We are deeply interested in the water plant that is now being established, but we are inclined to think that if a proper use is made of the upper waters, if due consideration is taken of all the interests, if the proper methods are adopted for getting uniform flow and necessary flow, that the power interests can be taken care of; that at the same time no very serious damage will be done to the interests I represent to-day. With that statement, I think you will understand our attitude before you.

MR. POWELL. What about the floating population that goes to the lake in the season?

MR. TAYLOR. There is no floating population in the Lake of the Woods, unless you call those who go there with their families the floating population.

MR. POWELL. Yes; I mean those.

MR. TAYLOR. I guess there is pretty well up to 2,000—between 2,000 and 3,000—the population that goes there.

MR. GLENN. Do people come there from other places?

MR. TAYLOR. A few come there, but it is very largely confined to the people who come from Winnipeg. Now, I want to refer just briefly to the nature of the damage. First, as to the docks and the boathouses. If the water is raised to a level of 1.062 or 1.062½ it will mean, in the case of very many, the construction of a new dock; but I would point out to you that in most cases that will mean the construction or reconstruction of the boathouses. If you raise the dock about 2 feet inside, as will be necessary, in many cases that means the doors must be raised; it will mean the roof must be raised, because they are usually built with a floor in them and rooms above, where some of the help, or some others, stay; and I am satisfied in many cases it will mean the reconstruction of the boathouse. Now, as to the damage which will be caused to the docks and boathouses, that is a matter which we can not urge too strongly, because you can pay for that; that can be put right. I have no doubt, by money.

MR. MIGNAULT. How much would it amount to, about?

MR. TAYLOR. That altogether depends on the character of the boathouse. Some boathouses \$1,400 or \$1,500, another \$2,000 or \$2,500. It depends on the nature of the boathouse and the nature of the work and the change you would have to make in it what the damage and loss must be. That would have to be estimated in every case. We are not trying to make a case for damages; we are trying to put the situation before you to prevent the damage, if possible; but when you leave the question of boathouses and docks and come to the beaches you enter a field that is entirely different. A question was put to some of the witnesses, "If your island were destroyed so that you would not care to use it at all, I presume you can sell it for something near what you gave for it." That might be true in some cases, but I would like to point out to you that if by the process of raising the waters very high you eliminated a very large number of the beautiful islands in the Lake of the Woods that you would do a damage to that lake as a summer resort that money could not compensate for. I believe it would be possible to do that; that is, the waters could be raised so high that many of the islands would be destroyed.

I am not absolutely sure that the level which we are speaking of would do that, but it would be possible, I think, by a very high level, to put many of these beautiful islands really out of business as summer resorts. That would mean a permanent injury to the Lake of the Woods as a summer resort which no money could pay for, nor could you estimate it, when you take into consideration the future development of this city, and the great population that is bound to be here some time. When you take into consideration that in the years in the future there will be many thousands of men building their homes down there for their families, in which their families will grow up, if you destroy largely the character of the islands that can be used for that purpose, you do an injury to that lake and the people of the city that this commission can not estimate, nor can any Government pay for.

MR. POWELL. Have you ever taken the trouble to inquire of the C. P. R. as to the traffic to Kenora?

MR. TAYLOR. No; I have not done that. Of course, they run special trains during all the camping seasons.

MR. POWELL. But they would have records of it.

MR. TAYLOR. We can get that from the C. P. R. There is a very fine service between Winnipeg and Kenora, several trains a day, and a campers' train every Friday at 5 o'clock; on Saturday there is one at 1.30; and then there is another back Sunday at 8 o'clock, and they are usually loaded with people going to visit, in addition to those who are steadily down there.

MR. POWELL. Is that the only summer resort Winnipeg has, with the exception of the beach up here?

MR. TAYLOR. Yes; it is the only one—well, I should not say that, because there is Minaki on the Winnipeg River below, which is developing very largely.

I think I have explained the matter, and the commission understands the attitude of the campers who have appeared before you, that we are not antagonistic to any other interests that might be taken care of in the city of Winnipeg, but we wish to present to you as fully as we can how our interests will be affected, and we trust



when all the matters are considered that you may find a way by which the power interests and all the other interests can be taken proper care of, and that at the same time no unnecessary damage will be done to the interests which we represent.

Mr. LAIRD. In reply to Mr. Taylor, my answer would be this: Would it not be in the interests of the campers who have houses on the lake to have a fixed maximum level, so that they could build to it, rather than have the uncertainty which has been existing here? I think that would meet all the requirements—a maximum level that would not be exceeded. In a state of nature there was no maximum level. But really, would it not satisfy his clients if there was fixed maximum level, even higher than last year, that they could build to?

Mr. TAYLOR. No; we have stated in our petition the lowest level that seemed feasible at all to the campers. It is 1,060½.

Mr. KEEFER. Is that your maximum?

Mr. TAYLOR. That is a compromise. We met as a body, and a good many wanted it lower than that; but in order to be reasonable, we agreed we would ask for 1,060.57.

Mr. KEEFER. Is that your highest maximum?

Mr. TAYLOR. Yes. Of course, Mr. Deacon intimated personally he would go to 1,061, and if the power plant of the city of Winnipeg were going to suffer, he would concede another 6 inches, but our position is that we will suffer if it goes beyond 1,060½. We do not want to suffer if we can help it. We want the facts known, so that proper consideration may be given to the whole question. Now, as we have had to begin, if anything should arise during the progress of the inquiry that would make it necessary for us to reply, I trust we have that right. I do not anticipate we will need to do it, but if any evidence should be given, to which it might seem absolutely necessary for us to reply, I presume we will have that right.

Mr. EVANS. At the session of the commission held at International Falls last September, Mr. Moodie made certain statements on behalf of the Canadian Northern Railway, in which he intimated that any increase in the level now established on the Rainy Lake would be injurious to the Canadian Northern structures on that lake. In this connection, I desire to call W. L. Mackenzie, bridge engineer on construction.

#### TESTIMONY OF W. L. MACKENZIE, BRIDGE ENGINEER, CANADIAN NORTHERN RAILWAY.

W. L. MACKENZIE, having been duly sworn, testified as follows:

Mr. EVANS. You are the bridge engineer of the Canadian Northern?

Mr. MACKENZIE. Yes.

Mr. EVANS. And your territory covers the Rainy Lake district?

Mr. MACKENZIE. It does.

Mr. EVANS. Will you kindly tell the commission what would be the effect on the structures of the Canadian Northern were the level of Rainy Lake now established increased in any way?

Mr. TAWNEY. What is that?

Mr. EVANS. Four hundred and ninety-seven at International Falls.

Mr. MACKENZIE. If it were increased to any extent, it might affect the Canadian Northern very seriously.

Mr. MAGRATH. What do you mean by "any extent?" One foot?

Mr. MACKENZIE. Two or three inches would not affect it at all, but if you raised it 5 or 6 inches it would affect it seriously.

Mr. MIGNAULT. Take 1 or 2 feet?

Mr. MACKENZIE. It would affect our works there—if you will allow me to refer to a memorandum——

Mr. TAWNEY. The present level is 97; if it were raised to 99, what would be the effect on the works?

Mr. POWELL. Do you mean the potential or the real?

Mr. TAWNEY. Take 497.

Mr. POWELL. Do you mean when the flashboards are on to the highest capacity?

Mr. TAWNEY. The level there to-day is 497.

Mr. MIGNAULT. The capacity of the dam is 497.

Mr. POWELL. That would mean the top of the flashboards.

Mr. TAWNEY. No, not the top of the flashboards; they are not on.

Mr. MIGNAULT. Without the flashboards the level is 497. Am I correct?

Mr. ROCKWOOD. Yes; that is right. The flashboards have never been put on.

Mr. POWELL. This evidence is going to fit into something. What view does Mr. White take? He spoke about the storage capacity of Rainy River. Did you take the crest of the dam, or the potential——

Mr. MEYER. Substantially 497.

Mr. POWELL. As the highest level?

Mr. MEYER. Yes.

Mr. MACKENZIE. The elevation of 497, the power company's development; that is, the hydroelectric at Fort Frances, if it were raised 2 feet above 497 it would begin to flood the bridge seats of the lift span on Rainy Lake; the wave action, especially in the fall, would splash the water up on the lift span, and render it difficult for us to operate.

Mr. EVANS. Would you repeat that?

Mr. MACKENZIE. Taking the crest of the dam of the hydroelectric at Fort Frances as being 497, if you were to raise the water 2 feet it would begin to flood the bridge seats of the lift span at Rainy Lake.

Mr. POWELL. That is the bridge immediately above International Falls?

Mr. MACKENZIE. Yes; the splashing of the water, especially in the fall of the year, would form ice on the operating machinery of the lift span, and render it inoperative. Perhaps I might refer to the fixed span at Rainy Lake, where there is a log channel for the navigation of logs; there always you have plenty of clearance underneath that for river drivers, and so on, to put those logs through; our clearance line underneath that fixed span is about at an elevation of 506.

Mr. POWELL. That would leave only 9 feet in the clearance at an elevation of 497?

Mr. MACKENZIE. Yes; about 9 feet.

Mr. POWELL. That would give you 2 or 3 feet anyway to come and go on there?



Mr. MACKENZIE. Yes; but if you raised it, there would be less. However, that does not affect the Canadian Northern; it would affect the lumbermen. Take that large fill of the new line across Rainy Lake, it is a large rock fill, our base of rail elevation was fixed at about 507.4, so that we would have a reasonable height above the water of the lake to prevent that same splashing of water and formation of ice on the rail, rendering the railway dangerous to operate. A rise of water of 2 feet would likely cause far more splashing and a greater formation of ice.

Mr. POWELL. What is the length that the wind would have a rake on the fill? Miles or what?

Mr. MACKENZIE. Approximately  $2\frac{1}{2}$  miles.

Mr. POWELL. It would kick up quite a sea then?

Mr. MACKENZIE. Yes. Farther east on the Canadian Northern Railway at a point that we call Bears Pass—

Mr. MIGNAULT. Is that on Rainy Lake?

Mr. MACKENZIE. Yes; it is on Rainy Lake; the clearance line for the log channel at that point is at an elevation of 502.4.

Mr. MIGNAULT. What is that?

Mr. MACKENZIE. At Bears Pass the clearance line under the channel for the passage of logs is at an elevation of 502.4. If the water were raised to to 499 in Rainy River there would only be about 3.4 feet clearance.

Mr. POWELL. At that particular point, what range has the wind?

Mr. MACKENZIE. At that particular point it is pretty well landlocked, and I would not expect much splashing from the water.

Mr. POWELL. Two or 3 feet to come and go on?

Mr. MACKENZIE. Yes; 2 or 3 feet to come and go on.

Mr. EVANS. All these structures that you have mentioned were constructed from an engineering point of view for a certain level?

Mr. MACKENZIE. Yes.

Mr. EVANS. 497?

Mr. MACKENZIE. Yes.

Mr. EVANS. And consequently as accurately as the engineering ability could determine, they were built for 497 and no higher level of the water?

Mr. MACKENZIE. Yes; we anticipated the water would not be raised above that 497, or, making an allowance for the fall in Rainy River between the outlet of Rainy Lake and hydroelectric development, for about a foot, or a few inches.

Mr. EVANS. All these structures are permanent structures on a concrete base and intended to be permanent structures?

Mr. MACKENZIE. Yes.

Mr. EVANS. And the level on which they were constructed was determined from a sure margin of safety and with the necessity of keeping open the Transcontinental road?

Mr. MACKENZIE. Certainly; that was a very great consideration.

Mr. EVANS. You mentioned the big fill across Rainy Lake. That is a very large fill, is it not?

Mr. MACKENZIE. Yes.

Mr. EVANS. How large?

Mr. MACKENZIE. There is one particular part of that fill from base of rail to rock, our soundings showed a depth of about 106 feet.

Mr. EVANS. That is the rock within the lake 106 feet deep?

Mr. MACKENZIE. Yes.

Mr. EVANS. You have determined a certain level which you consider to be the correct level to be safe from ice and so on at that point?

Mr. MACKENZIE. Well, it is a matter of judgment.

Mr. EVANS. To the best of your judgment you put up that line?

Mr. MACKENZIE. Yes.

Mr. EVANS. If the water were raised you would not have the same protection?

Mr. MACKENZIE. I rather think not.

Mr. EVANS. Unless you raised the fill; could that fill be raised in height?

Mr. MACKENZIE. Not safely.

Mr. EVANS. It would be practically impossible to raise that fill.

Mr. MACKENZIE. The carrying out of the work of raising the fill might destroy the balance of the fill as it is now.

Mr. EVANS. The fill that is in there cost a considerable sum, did it not?

Mr. MACKENZIE. I believe about \$1,200,000.

Mr. EVANS. And to raise that fill to compensate for any increased level would mean a very enormous expenditure, even granted that it could be carried out, which is an engineering problem?

Mr. MACKENZIE. I do not like to contemplate the possibility of having to raise that fill, it would be so dangerous so far as traffic is concerned, because the railway would be at large expense if a failure to raise the fill would occur. I might say that my fear of a failure would be that in raising that fill rock material would have to be deposited on each side of the fill as well as on top.

Mr. POWELL. To give it stability?

Mr. MACKENZIE. Yes. I would anticipate that rock would collect there and all at once it would force away the clay in the bottom of the river and cause a slump, carrying the balance of the fill with it. There is clay in the bed of the lake quite soft, which my observation showed me was mostly all displaced when the rock fill was put in.

Mr. EVANS. In order to carry out any work that would be necessary to meet the increased level above the 497 now established, an enormous expenditure of money would necessarily be involved, and even then it is doubtful if the work could be carried on to give the same protection and safety as at present established?

Mr. MACKENZIE. That is my opinion.

Mr. POWELL. The fair inference from your statement would rather upset a lot of facts in my own experience. Was not the determining factor in the elevation of this fill the grade of the road and not the question of safety in height above the water?

Mr. MACKENZIE. No; I think that is a mistake, sir. I recommended our chief engineer that the grade of the new fill should be kept a certain distance above the lake to take care of that eventuality, the splashing of water and the formation of ice.

Mr. POWELL. I could take you to a Government road—the Intercolonial—in New Brunswick where it runs along the Kennebecasis River for a mile, and that is a pretty big river, it ranges 2 or 3 miles, and their roadbed is on an embankment of gravel, and instead of being  $11\frac{1}{2}$  feet above the water, is not 6 feet.



Mr. MACKENZIE. That is on the river?

Mr. POWELL. Yes. I could take you to the C. P. R. where it crosses the Magaguadavik Lake, there is a lake there a couple of miles, and their embankment, I should say, is not more than 5 or 6 feet. I could give other instances of a similar kind, and it would look to me that the determining factor was not one of safety, but in compliance with the general contour of the land of the country and the question of grade?

Mr. MACKENZIE. Not so, sir. It is as I say. There is a heavy sea action in Rainy Lake, and it was for fear of storms. There are heavy storms occur in the fall season, and I believe mostly in the fall season, and it was to get rid of that feature and not have the roadbed covered with ice that I recommended that height, and along the river I would not expect the same action.

Mr. MIGNAULT. How long has the road been built?

Mr. MACKENZIE. This work of making the line across Rainy Lake was actually begun in 1910 and finished in 1914.

Mr. POWELL. How long is your fill at that particular point?

Mr. MACKENZIE. I believe the greatest stretch between islands is about 3,200 feet.

Mr. POWELL. At that particular point?

Mr. MACKENZIE. That is one particular stretch from island to island across Rainy Lake.

Mr. POWELL. But at this particular point where the rock fill is?

Mr. MACKENZIE. There are several rock fills, and the widest part is about 132 feet, and that is exposed to the northwest wind, which causes the greatest wave action there.

Mr. ROCKWOOD. You have known for some time that the possibility of raising the water higher than 497 was contemplated?

Mr. MACKENZIE. I have heard so, sir, but I have heard there was some agreement, of which I could not find any definite information, which confined it to 497.

Mr. ROCKWOOD. I understand that you can not refer to any definite agreement; you do not say that there is in fact an agreement, but that you heard some remark of that kind?

Mr. MACKENZIE. Well, I endeavored to get the best information I could.

Mr. ROCKWOOD. How did you get the information?

Mr. MACKENZIE. From inquiry of people at Fort Frances and in that vicinity. I was trying to find out to what height the lake was to be raised.

Mr. ROCKWOOD. Can you tell of whom you inquired?

Mr. MACKENZIE. I told my assistant engineer to make these inquiries and that was his report to me.

Mr. ROCKWOOD. Do you know of whom he inquired?

Mr. MACKENZIE. I think Mr. Gillen was the man who afforded him the best information.

Mr. ROCKWOOD. Do you know whether he went to the proprietors of the works to get the information?

Mr. MACKENZIE. I do not know.

Mr. ROCKWOOD. Do you know whether he examined the plans on file in the Department of Public Works at Ottawa or at Toronto?

Mr. MACKENZIE. I do not know that my assistant did so; I rather think not.

Mr. ROCKWOOD. Did you know that Mr. Moodie, who, I believe, is the chief engineer of the road——

Mr. MACKENZIE. Division engineer.

Mr. ROCKWOOD. Do you know that he attended the meeting of this commission at International Falls upon this subject last September?

Mr. MACKENZIE. He told me that he attended some meeting, but I do not know exactly where.

Mr. EVANS. He will be called.

Mr. ROCKWOOD. Have you ever made any observations as to the actual splashing of the ice or of the water, or how far it actually does show itself in the formation of ice?

Mr. MACKENZIE. I have had no opportunity to observe the splashing of water on the rock fill since it has been completed. I have seen the splashing of waves in other places.

Mr. ROCKWOOD. When was this work completed?

Mr. MACKENZIE. In 1914. I was never there while there was a big storm on.

Mr. ROCKWOOD. You could have observed the effect last winter, could you not, or in the fall of 1914?

Mr. MACKENZIE. I was not there when any heavy storm was on.

Mr. ROCKWOOD. And you have not observed it in 1915?

Mr. MACKENZIE. I was not there.

Mr. ROCKWOOD. Have you any reason to think that in either of these two years there would have been actually any inconvenience if the rails had been 2 or 3 feet lower?

Mr. MACKENZIE. As I say, it was to reduce the danger from ice as much as possible.

Mr. ROCKWOOD. But speaking of the fact from observation rather than of your precautions in advance, have you made any observation to show whether or not there was sign of danger that would manifest itself if the rails were 2 or 3 feet lower?

Mr. MACKENZIE. I have been told that in one heavy storm the spray from the waves began to wash the ballast from between the ties across this big fill on the Rainy Lake; that is only hearsay.

Mr. ROCKWOOD. Who told you that?

Mr. MACKENZIE. I really forget; I think it was the roadmaster; I am not sure; I would not be positive.

Mr. ROCKWOOD. You mean the ballast?

Mr. MACKENZIE. Gravel.

Mr. ROCKWOOD. Is there gravel ballast on this rock fill?

Mr. MACKENZIE. I saw it, sir.

Mr. ROCKWOOD. Don't you use rock ballast?

Mr. MACKENZIE. None in that vicinity; no rock ballast used in that vicinity.

Mr. ROCKWOOD. You could use rock ballast on this fill, could you not?

Mr. MACKENZIE. It could be used, possibly, at great expense.

Mr. ROCKWOOD. And if you did use rock ballast, any danger of washing from the spray would be removed?

Mr. MACKENZIE. I would not say removed.

Mr. ROCKWOOD. What would you say?

Mr. MACKENZIE. Lessened.

Mr. ROCKWOOD. Greatly reduced?

Mr. MACKENZIE. Yes.



Mr. ROCKWOOD. I understood you to say that if the roadbed were to be raised, the method would be by dumping rock on either side from the track?

Mr. MACKENZIE. Necessarily so.

Mr. ROCKWOOD. That was the method of construction, substantially, was it not?

Mr. MACKENZIE. The same method would have to be adopted.

Mr. ROCKWOOD. What is the reason that the same construction could not be carried a little further that was used in the actual construction?

Mr. MACKENZIE. During the actual construction there were several slumps took place; in fact, it was almost continually going on.

Mr. ROCKWOOD. Until it reached that angle of repose that material of that kind will take?

Mr. MACKENZIE. You may put it that way.

Mr. ROCKWOOD. You do not mean, do you, that if the water had been 3 feet deeper than it actually was you could not have constructed this fill at this place, do you?

Mr. MACKENZIE. Beg pardon.

Mr. ROCKWOOD. You do not mean that if the water had actually been 3 feet deeper than it was, or the distance to the solid bed 3 feet greater than it actually was, you could not have made the fill at this place?

Mr. MACKENZIE. I did not say so.

Mr. ROCKWOOD. Then, if you could at the time have filled 3 feet greater, or filled in water a 3 feet greater depth, why could you not go on now?

Mr. MACKENZIE. I think I explained, sir; owing to the danger of putting more heavy rock and a large quantity of rock on the side hill, I would be afraid of a further slump.

Mr. ROCKWOOD. Would the danger be any greater than it would be if originally the actual depth had been a few feet greater than it was?

Mr. MACKENZIE. You mean depth to the——

Mr. ROCKWOOD. Depth from the top of the fill down to the base, rock or clay base, whichever it may be?

Mr. MACKENZIE. I do not think a few feet difference in height of the fill would affect the slump very much; that the slump would be almost sure to occur.

Mr. ROCKWOOD. And it did occur, as you say?

Mr. MACKENZIE. Yes; and I anticipate it occurring again.

Mr. ROCKWOOD. It is true, is it not, that in depositing fresh material, whether clay or gravel or rock, there is a process of sliding and tumbling down until some angle is reached at which the material becomes stable?

Mr. MACKENZIE. That is generally accepted, sir.

Mr. ROCKWOOD. And if it were true that you had to raise the tracks 3 feet, it would be, would it not, substantially the same process as you would have gone through in building the fill 3 feet higher at the beginning?

Mr. MACKENZIE. Certainly.

Mr. ROCKWOOD. And that difference of 3 feet would not have prevented, or have been a determining factor, in this construction at the outset?

Mr. MACKENZIE. I do not understand your question.

Mr. ROCKWOOD. Well, put it in this way: If the actual depth had been 3 feet greater, this location would have been selected just the same and the work would have been constructed just the same, would it not?

Mr. MACKENZIE. It would.

Mr. ROCKWOOD. Now, I understand you to say that if the water were 2 feet higher it would begin to reach the bridge plates of the lift span?

Mr. MACKENZIE. The bridge seats, I said, of the lift span.

Mr. ROCKWOOD. You are not speaking, and have not been speaking, of the bridge at the output of the lake at Pithers Point?

Mr. MACKENZIE. No.

Mr. ROCKWOOD. It is the lift bridge in the fill across the lake where you would anticipate difficulty?

Mr. MACKENZIE. Yes.

Mr. ROCKWOOD. Is there not any way of overcoming that, so that if the water were 3 feet higher you could still lift it?

Mr. MACKENZIE. I hate to contemplate such a proposal as raising our bridges.

Mr. ROCKWOOD. I might concede that, but is there not a way in which it could be done?

Mr. MACKENZIE. At enormous expense.

Mr. ROCKWOOD. Will you be kind enough to explain what the process would be and the expense?

Mr. MACKENZIE. I do not know: I have been thinking of that, what would be the best process to raise our bridges, if that were necessary, and I have not been able to determine it.

Mr. ROCKWOOD. You have not made any estimate of what the expense would be?

Mr. MACKENZIE. No; I have not made any estimate, only I know that the actual cost would be very high—hundreds of thousands of dollars, perhaps.

Mr. EVANS. In connection with the point raised by Mr. Rockwood, that the adding of 3 feet on now would be simply the same process, or be the same as building the fill 3 feet higher, had it been so required in the original construction, that would not be the same process; it would be adding something to a structure already built?

Mr. MACKENZIE. We would have to raise it on the top and put material over the sides. I think I explained that to Mr. Rockwood, and the danger I anticipate would be from putting the material over the sides. I think I explained that, that it would pile up until it would start to go, and go all at once and carry a good portion of the embankment with it.

Mr. EVANS. When the original rock fill was made, you said there was an earth covering on the rock?

Mr. MACKENZIE. Clay.

Mr. EVANS. When the rock fill was made, what became of that earth?

Mr. MACKENZIE. Displaced almost entirely by the rock.

Mr. EVANS. The sides of the present rock fill?

Mr. MACKENZIE. Yes.

Mr. EVANS. If one were now to go to work and dump rock on the side of the fill, what would become of the rock? Where would it find a resting place? In other words, would it follow down the side



of the present embankment to bed rock or would it rest on the clay formed at the side of the present rock—

Mr. MACKENZIE. It might rest for a time. I presume this is what would happen: It might rest for a time on the clay, until such time as the clay would give, and then the rock would go.

Mr. EVANS. And that would create an additional stress on the side of the present rock fill, at the point where it laid on the clay?

Mr. MACKENZIE. Well, the embankment is apparently strong enough to carry that weight, but what I would be afraid of would be that the material, in piling up, would eventually reach a point where it would shove the clay all at once and carry the rest of the rock with it.

Mr. POWELL. And tear away part of the present embankment?

Mr. MACKENZIE. Yes.

Mr. MAGRATH. Why should it tear away part of the present embankment?

Mr. MACKENZIE. That is what it has done already while we were constructing that roadbed, and I anticipate the same process to go on; that has been our experience.

Mr. MAGRATH. I do not quite follow you as to how it is going to carry out part of your present embankment?

Mr. MACKENZIE. I do not know that I can properly explain it to you, but I know that has been our experience while the work was going on, and I would anticipate the same thing happening.

Mr. POWELL. The reason I suggested it is that I have seen it myself. All that holds the stones is the law of gravity. There is no cement about it, and when the base is broken and there is a slide it takes the uneven surface.

Mr. EVANS. If you could get to the base immediately—to widen it—

Mr. MACKENZIE. It would solve it enormously; but it is impossible to get to the base to build up from it.

Mr. EVANS. Would the approach at mile 203 be affected?

Mr. MACKENZIE. That is across Little Otter Tail Creek?

Mr. EVANS. Yes.

Mr. MACKENZIE. Yes; it would be affected.

Mr. EVANS. What would the elevation of that be?

Mr. MACKENZIE. I can not recall the actual elevation. I know that the water was lapping the base of the wooden stringers. It is a timber trestle across that creek, and the water was lapping the base of the timber stringers.

Mr. GLENN. Mr. Mackenzie, I was called out and I did not get your answer a little while ago. If in the first instance, when the water was at 497, you had built this fill would it have been harder at this time, if the water raised 2 feet, to make it safe than it would have been when it was originally constructed?

Mr. MACKENZIE. I think it would be harder now to make it safe. We could easily have raised it at the time of construction.

Mr. ROCKWOOD. Mr. Mckenzie, you know exactly the slope, do you not, of the sides?

Mr. MACKENZIE. Of a rock fill, sir?

Mr. ROCKWOOD. Of the present rock fill in the water; or if you do not know it, you could easily ascertain it.

Mr. POWELL. The batter is 1 foot in what?

Mr. MACKENZIE. It usually takes a slope of about 1 vertical to 1 horizontal.

Mr. POWELL. That is an angle of about  $45^{\circ}$ ?

Mr. MACKENZIE. About that, sir.

Mr. ROCKWOOD. You could easily ascertain exactly what the slope of this fill is, could you not?

Mr. MACKENZIE. That was done on one or two occasions while the work was under construction. My assistant did so, and the portion of the slope that he was able to measure showed that it was taking a slope of about 1 to 1.

Mr. ROCKWOOD. By sounding you could go the whole length, could you not, and determine precisely what the slope is?

Mr. MACKENZIE. I presume you could.

Mr. ROCKWOOD. That would tell you exactly where the toe of the present fill is, would it not? Is that what you call it?

Mr. MACKENZIE. Yes; you could determine very closely where the toe of the fill would be.

Mr. ROCKWOOD. Is there any reason why you could not by means of scows dump the stone in the water so that it would take its precise place, beginning at the toe and then going on up the side of the fill?

Mr. MACKENZIE. I do not think you could, sir, very well. In the first place, a single rock—and those rocks would be put in singly—I would not expect would go down through that clay to the rock bed of the lake.

Mr. ROCKWOOD. Probably a single rock would not, but the weight would carry them down, would it not, as it accumulated?

Mr. MACKENZIE. Well, that is guesswork. I could not reply to that.

Mr. ROCKWOOD. Mr. Mackenzie, if railroad necessities required it, you could find a way, could you not, to raise that track?

Mr. MACKENZIE. By paying for it.

Mr. ROCKWOOD. And you have not investigated or tried to determine how you would do it if it were necessary, have you?

Mr. MACKENZIE. I have not gone into it very thoroughly, but I have been guessing in my own mind as to whether this or that method would do or possibly some other method might be better.

Mr. ROCKWOOD. And you have not tried to reach a definite conclusion as to what would be the safe method, have you? You stopped with the opinion or impression that there would be some difficulties?

Mr. MACKENZIE. There would be difficulties, certainly.

Mr. ROCKWOOD. You have not tried to estimate the cost of adopting a safe method in following it through from the beginning?

Mr. MACKENZIE. I have made no estimate of cost. I only know that it would be high.

Mr. POWELL. That is a matter of mathematical conclusion. I just figured up on the fill he referred to. A rise of 3 feet would mean 66,000 additional yards.

Mr. MACKENZIE. I had not made that calculation.

Mr. ROCKWOOD. How long is that portion of the fill which is 106 feet deep?

Mr. MACKENZIE. It would reach 106 feet at only one point.

Mr. ROCKWOOD. During what linear extent?

Mr. MACKENZIE. There is only one point at which it reaches 106 feet in depth.



Mr. ROCKWOOD. Is that for 1 rod or for 10 rods or 20 rods?

Mr. MACKENZIE. It might be for about 100 feet.

Mr. ROCKWOOD. Do you know what the average depth is?

Mr. MACKENZIE. No; I have not taken the average depth.

Mr. ROCKWOOD. By far the greater portion of it is 40 feet or less, is it not?

Mr. MACKENZIE. No, sir; I should say it is much deeper than that.

Mr. ROCKWOOD. Then, you have not any estimate of what the average is.

Mr. MACKENZIE. It would possibly go about 75 feet as an average depth.

Mr. ROCKWOOD. Did you have charge of making the plans for this fill?

Mr. MACKENZIE. I did.

Mr. ROCKWOOD. Did you not make soundings before beginning the work so as to know what the average would be?

Mr. MACKENZIE. Certainly.

Mr. ROCKWOOD. You must have that average somewhere, but you do not remember now what it is.

Mr. MACKENZIE. I did not make an average depth. I did not estimate what the average depth would be.

Mr. ROCKWOOD. Have you a profile that would show the bottom?

Mr. MACKENZIE. I have a profile, certainly.

Mr. ROCKWOOD. Would you be kind enough to bring that with you in the morning?

Mr. POWELL. Mr. Mackenzie, I might call attention to one or two similar cases, with which you and other gentlemen in the room are no doubt familiar. The great highway from Prince Edward Island to the mainland is through Pointe du Chêne. At Pointe du Chêne there is a Government wharf extending out and the rake there is fully 40 miles on that wharf; and that wharf at high water is not 6 feet above the tide, and the rail is not 6 feet above the tide. There is also a place where the proposed communication with Prince Edward Island is to be made at Cape Tormentine. The pier at Cape Tormentine juts out into Northumberland Strait, where there is a rake of 60 miles one way and more than 60 miles the other way. The Atlantic Ocean practically runs in on the southern slope, and at high water the rail on that pier is not 6 feet above the water, and still they are not troubled with ice. Conditions at Cape Tormentine are similar to those to which you have been referring. It is rock dumped in and on the top of this loose rock they have loosely laid flags, and not manipulated by the mascons at all, but simply laid there without a tool being placed upon them. That work stands there with the great northeast storms of the Atlantic coast breaking upon it. Also, if you are familiar with the Boston & Maine at Portland you know that the rail is not 10 feet above high water there.

Mr. ROCKWOOD. Mr. Chairman, there are some features of this matter that I did not anticipate at all, and I would be glad if we could postpone it until morning in order to have a chance to speak with these engineers.

Mr. MAGRATH. Very well, Mr. Rockwood. Gentlemen, as it is now half past five we will adjourn until 9.30 o'clock to-morrow morning.

(The commission thereupon, at 5.30 o'clock p. m. adjourned until 9.30 o'clock a. m., Feb. 2, 1916.)

WEDNESDAY, FEBRUARY 2, 1916.

Pursuant to the adjournment, the commission met at 9.30 o'clock a. m.

**TESTIMONY OF MR. W. L. MACKENZIE—Continued.**

Mr. W. L. MACKENZIE, who had been previously sworn, resumed the stand, and upon further examination testified as follows:

Mr. ROCKWOOD. Mr. Mackenzie, have you the profile that we were speaking of yesterday?

(Mr. Mackenzie thereupon produced and handed to Mr. Rockwood the profile referred to, which was marked "Exhibit No. 5.")

Mr. ROCKWOOD. Mr. Mackenzie, I find that this profile, which is marked, "Canadian Northern Railway profile of proposed revision across Rainy Lake, district of Rainy River," represents the level of the new track of which you had spoken yesterday of the rock fill.

Mr. MACKENZIE. Yes, sir.

Mr. ROCKWOOD. The continuous line at the top represents what?

Mr. MACKENZIE. The subgrade.

Mr. ROCKWOOD. And the ties and rails are above that?

Mr. MACKENZIE. Yes.

Mr. ROCKWOOD. I find here certain levels; for instance, high-water level 995 and low-water level 983.60. To what bench mark do they refer?

Mr. MACKENZIE. They refer to a datum plant that was used on the Canadian Northern Railway in the vicinity of Rainy Lake.

Mr. ROCKWOOD. Do you know how it relates to sea-level datum?

Mr. MACKENZIE. No.

Mr. ROCKWOOD. Nor how it relates to the Government bench mark at Fort Frances?

Mr. MACKENZIE. No.

Mr. ROCKWOOD. Then, you are not able to tell any more specifically what the actual levels are than what this map shows?

Mr. MACKENZIE. The actual high absolute levels above sea level?

Mr. ROCKWOOD. Yes.

Mr. MACKENZIE. No; I am not able to say definitely.

Mr. ROCKWOOD. This map shows exactly 400 feet to the inch horizontally and 20 feet to the inch vertically. Is that correct?

Mr. MACKENZIE. Yes.

Mr. ROCKWOOD. I have not examined the map carefully, but I will let it be identified and offer it in evidence. It may be of service.

Mr. EVANS. Mr. Chairman, I object to that profile being received as an exhibit. I do not think you want to go into the question of railway construction. That is simply a profile that Mr. Moodie has with him, and I do not think it has any bearing on the matter.

Mr. MAGRATH. Still, if Mr. Rockwood wants it in, is there any real objection to it?

Mr. EVANS. There is no objection so far as concerns the disclosure of information on the plan, except that there are company datums which do not agree with the datums—

Mr. MAGRATH. Can not your engineers correlate the datums?

Mr. EVANS. No doubt they can reconcile them, although I do not know that they can do it at the present time.



Mr. MAGRATH. I do not see why it should not be received in evidence.

Mr. GLENN. Mr. Mackenzie, one of the consulting engineers, asked me this morning to inquire as to how you operated your road while you were constructing that fill.

Mr. MACKENZIE. The former line was a pile trestle from Rainy Lake, from island to island, on another location.

Mr. GLENN. Is that still in existence?

Mr. MACKENZIE. No, sir; we pulled the piles out after the new line was constructed.

Mr. TAWNEY. How was that fill constructed, by driving piles through it?

Mr. MACKENZIE. No, sir.

Mr. TAWNEY. Just running out and dumping the rock in?

Mr. MACKENZIE. No, sir. The subcontractor for that work devised a scheme of his own for which he obtained a patent, I believe. The main idea of his scheme was two long steel girders. The inner end toward the end of the new fill was supported on two scows with a bridge between them. The outer end was supported on one large scow and the girders projected beyond that. The girders were widely separated. I forget the exact distance they were apart. A track was laid between the girders. The dump cars were run out on this track and dumped at the end of the fill and beyond. This long projection of the girders beyond the outer scow was for a tail track for empties. As the cars were emptied they were pushed on the tail track.

#### TESTIMONY OF MR. W. T. MOODIE, OF WINNIPEG, CANADA.

W. T. MOODIE, having been duly sworn, testified as follows:

Mr. EVANS. Mr. Moodie, you are an engineer in the employ of the Canadian Northern Railway?

Mr. MOODIE. Yes, sir.

Mr. EVANS. Your territory covers the Rainy River district?

Mr. MOODIE. Yes; it does.

Mr. EVANS. You are familiar with the Rainy River levels as at present maintained?

Mr. MOODIE. Yes.

Mr. EVANS. Will you kindly tell the commission what, in your opinion, would be the effect if the waters of the lake were now raised above the existing levels?

Mr. MOODIE. The effect, I think, would be prejudicial to our embankments not only on the lake itself—that has been gone into by Mr. Mackenzie—but over a considerable mileage east of that point.

Mr. EVANS. About how many miles?

Mr. MOODIE. We have a bridge at 203A and we have continuous association with the lake from that mileage to 206, a distance of over 23 miles, that is affected by Rainy Lake levels.

Mr. EVANS. If the level of Rainy Lake were raised, in what way would it affect this 23-mile section?

Mr. MOODIE. A large stretch of that 23 miles is very little above the present high-water level of the lake, and the effect would be that

for a majority of that distance it would have to be raised according to the rise of the lake if the lake were raised higher than it is now.

Mr. EVANS. Even if it were raised, would that satisfactorily take care of the situation?

Mr. MOODIE. So far as the balance is concerned?

Mr. EVANS. I mean, would the raising of the lake affect the foundation throughout that section?

Mr. MOODIE. The foundation is affected now by the lake.

Mr. EVANS. Would it be more seriously affected if the level were raised?

Mr. MOODIE. Yes; I believe it would for this reason, that the work to be done in raising it would be new work. The work that is there now is old fill.

Mr. POWELL. That is, it would affect the earth embankment?

Mr. MOODIE. Yes, sir; or gravel or clay, as the case may be.

Mr. EVANS. In your experience as an engineer, have you had anything to do with large fills such as Mr. Mackenzie discussed?

Mr. MOODIE. Yes, sir.

Mr. EVANS. What, in your opinion, would be the effect of trying to raise that fill 3 feet, or raising the water on the present fill 3 feet?

Mr. MOODIE. I agree entirely with what the former witness stated with regard to the extreme probability of danger in attempting to raise the heavy rock fill.

Mr. EVANS. You think, then, it would be absolutely dangerous to try to raise it by adding to the present rock fill?

Mr. MOODIE. I see a very great element of danger in it.

Mr. EVANS. For what reason?

Mr. MOODIE. We know from the experience that has been gained on the construction of that fill that a large amount of clay in the bottom of the lake has been displaced, and the strong probability is that that clay would interfere with any additional side filling in endeavoring to raise the present fill.

Mr. ROCKWOOD. Still, you agree with Mr. Mackenzie, the bridge engineer, that the process of enlarging would be exactly the same as the process of building it to its present size, I take it?

Mr. MOODIE. Well, we could not employ the same method of widening or raising as we did in constructing.

Mr. ROCKWOOD. No; you could not employ the scow method. You would either dump from other scows or dump from the rails, but the process would be substantially the same.

Mr. MOODIE. It would be what is commonly known as the process of lifting track.

Mr. ROCKWOOD. Yes; if the grade is enlarged, but the process of enlarging the grade, widening the embankments, would be substantially the same as that of the original construction.

Mr. MOODIE. That is the only method that suggests itself to me.

Mr. ROCKWOOD. Now, if the lake had been 3 feet higher, these 23 miles of road would have been located substantially where they are, and they would have been built at a suitable grade, would they not?

Mr. MOODIE. Do you mean the road as originally located and built?

Mr. ROCKWOOD. Well, the road where it is located now.

Mr. MOODIE. Do you mean had the natural level been 3 feet higher than it is?



Mr. ROCKWOOD. Yes.

Mr. MOODIE. I would not agree with that at all. The contour at the water's edge would have been very much different had it been raised 3 feet.

Mr. ROCKWOOD. Can you point out where the difference would have been?

Mr. MOODIE. Probably along the Big Grassy Portage.

Mr. EVANS. Mr. Chairman, that is all the evidence we wish to submit in the matter in order to draw the attention of the commission to the fact that if any rise in the level of Rainy Lake is established it would affect most injuriously the structures of the Canadian Northern Railway, which have been created on the basis of 497. That has been assumed to be the level, and those structures have been made with scientific calculation by the engineers to meet that level. For any other or higher level they are inadequate.

Mr. TAWNEY. Mr. Evans, were you at the time of the construction of this road aware of the fact that in the contract signed by the Province of Ontario and the Dominion Government that there was a proviso that the level could be raised to 500 if necessary?

Mr. MOODIE. I presume we were informed that it might be raised to be practically any level.

Mr. TAWNEY. But there is a stipulation in the contract between the Government and the railroad fixing the level at 497, with the proviso that if thereafter it should be deemed necessary the Government will permit the raising of the level to 500.

Mr. MOODIE. I was not personally aware of that. At any rate, at the present time the structures have been created to meet a level of 497, and it may be that a margin of safety that is more than ample has been provided in the case of the large fill at other places, but there is one point to be kept in mind, and that is that this is a central section of a transcontinental railway and we must keep it open if at all possible. We simply submit the evidence that has been offered to show that any rise in level above 497 would most injuriously affect the structures of the Canadian Northern Railway.

Mr. ROCKWOOD. I will ask Mr. Moodie to put into the record what he has just stated to me so as to correlate the railroad datum with the Government datum, the 500 bench mark.

Mr. MOODIE. This is the correlation that has been used by our engineering department in the past. By subtracting 495.6 from the elevations of the C. N. R. profiles you will secure the power companies' datum.

Mr. TAWNEY. The power companies' datum is the same as the Government's datum, that is the 500 bench mark at Fort Frances?

Mr. MOODIE. Yes, sir.

Mr. ROCKWOOD. Mr. Chairman, I have made that subtraction, and I want to see if I have drawn the correct conclusion. I have taken high-water level 995 and have subtracted from it 495.6 and it leaves 499.4 as the difference.

Mr. MOODIE. That computation is correct.

Mr. ROCKWOOD. Then the line indicated on this map as high-water level is 499.4?

Mr. MOODIE. I am not prepared to swear to the high-water mark on our profile, Mr. Rockwood, for the reason that the origin of that mark, to the best of my knowledge, was that of the location engi-

neers, and probably the high-water mark on Rainy Lake did not present to them 15 or 18 years ago the significance that it now presents to us.

Mr. ROCKWOOD. But that is what the figures 995 mean, is it not?

Mr. MOODIE. Your computation so far as that is concerned is correct but as to being satisfied with that high-water mark, that is another question.

Mr. ROCKWOOD. Yes; I understand that, but this map, which is the profile, was prepared not with reference to the original location 15 years or more ago but with reference to the actual making of this new rock fill. Is not that correct?

Mr. MOODIE. Yes and no, Mr. Rockwood, in this respect, that the old high-water mark is reproduced; that is, the original high-water mark as shown in the preliminary location is reproduced on that, but we had cognizance of the 497 dam elevation when this revision was built from 1910 to 1914.

#### TESTIMONY OF W. W. RICHARDSON, OF WINNIPEG, MANITOBA.

Mr. RICHARDSON. I would like to attract the attention of the commission to our existence down there and the condition we are in. I understood that the inquiry here was with regard to power matters, but I represent the Minakee Campers' Association. We are situated where the Grand Trunk Pacific crosses the Winnipeg River. We have quite a colony of campers there similar to those on the Lake of the Woods, with the exception that we are on the river while they are on the lake, and any change in levels would probably affect us even more than it would them. In a great many ways it would probably parallel the effect on the Lake of the Woods, but, as you will readily understand, we are affected there by the current in the river, especially at The Dalles, which is above the Minakee. If the water were raised there very much it would affect navigation. That is a very narrow channel through which the water is forced there and the current becomes so strong that it will be almost impossible to navigate it if the water is raised another foot or so. The point I want the commission to take into consideration, as I am sure it will, is the effect any rise in the level will have upon us.

Mr. TAWNEY. How far below the outlet of the lake are you?

Mr. RICHARDSON. About 18 miles down the Winnipeg River. All that was said yesterday with reference to the effect on the islands probably applies to us to a certain extent, although I do not think it applies so much to us as it does to them, excepting that there was one point that was not brought out, and that is the effect upon us from a sanitary standpoint. Necessarily people building summer cottages generally build them as close as they can to a sandy beach, if they have one, and our experience on the Winnipeg River is that behind every sandy beach is a little swamp that is generally dry, but if the water were raised above a foot or two, it would become, as we found it was this year at high water, rather a nuisance in that it would cause a condition that is not sanitary. The water is settling back into those little swamps and becoming undesirable. At Minakee there is a large summer hotel built by the news agency connected with the Grand Trunk Pacific Railway. They found a lot of trouble this year during high water. But the trouble is we can not get any real information as to what effect this is going to have on us at the present time. Just below us 7 or 8 miles there is a very strong



current known as the White Dog Rapids, and we would like to be considered when you are coming to your conclusion regarding any methods that you may suggest to improve the present condition. Of course, I think myself that so far as the summer cottages are concerned the range is really the matter that affects them most. The greater the range the greater they are affected every year, necessarily, because it is possible to build away from the high water, although a great many of us would be very much damaged at the present time inasmuch as we would have to raise our boathouses very much, but necessarily a range of 3 feet is more desirable to us than a range of 5 feet because our boathouses are that much more accessible during the whole period of the time we live there.

Mr. TAWNEY. Would not a range of 5 feet be better than a range of 8 feet, as it has been in a state of nature?

Mr. RICHARDSON. Far better; yes, sir.

Mr. TAWNEY. So your conditions would be improved by the regulation of the levels of the Lake of the Woods, no matter what the range, if it were less than the range of levels in a state of nature?

Mr. RICHARDSON. I have been told by your engineer that it is hard to tell the effect that creating a stated level at Kenora will have upon us down there. It would all depend upon the manner in which the water was allowed to go through there, because where we are particularly affected, at The Dalles, there is a very narrow space, and we do not know what effect it would have. In fact, I do not think Mr. White really knows what effect it might have. At least, that is what I understood. Am I right in that, Mr. White?

Mr. WHITE. You asked what the effect would be, and I said you could not determine what any definite effect would be until it was decided what the outflow would be from the lake; that you were more concerned, in fact, you were only concerned, with the outflow from the lake as affecting levels in the Winnipeg River and not with levels per se in the Lake of the Woods.

Mr. RICHARDSON. Exactly. It is outflow that affects us more than the levels of the Lake of the Woods, and we are not in a position to know how it is going to affect us until we know what is going to be recommended, but we would like to be considered when that recommendation is made, because we have probably 500 campers there and we anticipate that we are going to probably exceed in numbers the campers on the Lake of the Woods. We are very ambitious as far as the camping business goes. It has been in existence over four or five years.

Mr. MAGRATH. What is the average expenditure per camper?

Mr. RICHARDSON. Do you mean in the way of buildings?

Mr. MAGRATH. Yes.

Mr. RICHARDSON. Well, there are places down there from \$500 to—well, one man was offered \$10,000 for his camp. Of course, a big part of that would be due to the location.

Mr. MIGNAULT. How long does the camping season last, Mr. Richardson?

Mr. RICHARDSON. Well, it varies from two months to three and a half months.

Mr. MIGNAULT. I understand that your interests are restricted to the Winnipeg River, some 18 miles below the outlet of the lake?

Mr. RICHARDSON. Absolutely.

Mr. MIGNAULT. What do you require the commission to guard you against, a range of levels of high water, or what? In the past how has the water been? Has there been a difference of levels in the different seasons?

Mr. RICHARDSON. There will probably be a range this year of, I should say, between 4 and 5 feet. We have had higher water this year than I have ever seen down there before, and it was lower this fall than I have ever seen it before.

Mr. MIGNAULT. What was the extreme between the highest level and the lowest level during the last season on the Winnipeg River?

Mr. RICHARDSON. While we were there?

Mr. MIGNAULT. Yes.

Mr. RICHARDSON. Well, the extreme was always high this year. I do not think it was more than about 2 feet or a foot and a half. It would all depend on the time of the year that you went down there. The water rises very rapidly there about the last of June. I was down there earlier this year and my experience would not be the experience of most of the campers, because the water was quite low and it came up very rapidly and was up higher than I had ever seen it before.

Mr. TAWNEY. Did it ever get out of its banks last year?

Mr. RICHARDSON. No. We have a peculiar environment down there. It is high and rocky and could not get out of its banks very well because the rocks are precipitous. We are not affected like Kenora. There are cases where individuals would be affected by the water going over low islands, but that is exceptional. If we knew our level and could build to it in the future we would be fairly well protected, but heretofore we have not known that. We would be better off if a settled level were established and the range were not too great.

Mr. CAMPBELL. We would like to help you; at least we do not want to hurt you, but it has been suggested to us that if those in control at the outlet when the water was high had let more of it out, thus reducing the height at the Lake of the Woods, that would have increased your difficulty instead of lessening it by throwing more water on you.

Mr. RICHARDSON. We have been told that, too. We have been trying to get information on that subject. We do not know whether that is a fact or not.

Mr. CAMPBELL. It strikes me that that is obvious. If early in July the stop logs had been taken out so as to induce a rapid fall in the Lake of the Woods, your flood water would have been greatly increased at the very time that you felt it most.

Mr. RICHARDSON. That is what happened this year.

Mr. CAMPBELL. If a regulation by which the range, whatever it may be, is spread over 12 months at least is adopted, and if method A be adopted, spreading over a long cycle of years, holding the water in the Lake of the Woods, would not that be better for you than the natural condition where it would rush in at the end of June and in three or four weeks would rush out again?

Mr. RICHARDSON. Yes; it would be better.

Mr. ANDERSON. How long have people been going down to Mina-kee to camp?



Mr. RICHARDSON. They started probably in 1910. It is a comparatively new camping place.

Mr. ANDERSON. Approximately how many people have summer homes down there?

Mr. RICHARDSON. We have estimated from 400 to 500. I do not mean different families, but altogether. There is a hotel there that will accommodate, I think, 300 or 400 people.

Mr. ANDERSON. It is a matter more particularly, then, of the number of people than of the number of single individuals who have acquired homes there?

Mr. RICHARDSON. There are a number of people who have acquired islands there who have not built their homes.

Mr. ANDERSON. I am speaking of those who built.

Mr. RICHARDSON. The estimate we made was that there were 400 or 500 people.

Mr. ANDERSON. And you made no estimate of the number of camps?

Mr. RICHARDSON. No.

Mr. ANDERSON. In building there have you paid any attention to any particular levels to which to build, with reference to high-water mark?

Mr. RICHARDSON. Yes; we paid attention to that. We got the information from the old-timers there; at least I did, personally, and built above that.

Mr. ANDERSON. I am instructed that most of the people paid no attention to the high-water mark at all.

Mr. RICHARDSON. Of course, the high-water mark there is a mark that is very much higher than the mark of this year. You would be building out in the water entirely, if you paid any attention to that.

Mr. ANDERSON. Then, you have not been building with reference to that?

Mr. RICHARDSON. Not with reference to the old high-water mark.

Mr. ANDERSON. What high-water mark have you been building with reference to?

Mr. RICHARDSON. Personally, I tried to ascertain from an old-timer there how high the water had been for a number of years, and I built higher than that.

Mr. ANDERSON. That water would be higher than it was last year, would it?

Mr. RICHARDSON. No; it was 2 or 3 inches under the water last year.

Mr. ROCKWOOD. Mr. Richardson, am I wrong in the conclusion that I draw in my mind that an effort to equalize the flow of Winnipeg River will promote the interests of the campers which you represent?

Mr. RICHARDSON. Ultimately, yes. Raising the present level would necessitate a lot of expense in moving boathouses and things like that, but it would promote their benefit, with the exception of the effect on the current that any increase in water there would have. We have a current on each side of this camp. Below the bridge and above the bridge there are currents that might be affected by an increase of water and be detrimental to people boating.

Mr. POWELL. Is your camping ground situated on an expansion of the river?

Mr. RICHARDSON. The Minakee is situated where the river joins two lakes. Cone Lake and Sand Lake are about half a mile apart and they are joined by the river. The railway crosses in that space between the two lakes. As a matter of fact, the campers are back of these lakes. There are not very many of them there. Minakee itself is situated there.

Mr. LAIRD. You have spoken of this as the Winnipeg River. As a matter of fact, Mr. Richardson, it is really a series of lakes, is it not? I would suggest that you describe it for the commission. It is not really a river but a series of lakes comprising many miles in area?

Mr. RICHARDSON. No; I do not think that is a proper way to describe it.

Mr. LAIRD. Will you describe the various lakes on which the campers are and give their areas? That is what I would suggest.

Mr. RICHARDSON. When you leave Kenora the river proper at first is very narrow. It widens out at some places and through small openings you will find lakes of more or less proportion all the way down, but when you reach Minakee, Cone Lake is practically what you call up the river. There is a big point and Cone Lake is up the point, and there is another channel that we understand opens the same waters into Cone Lake through another source, the same waters that come through the Winnipeg River. Then when you go below Minakee the river widens out into a small lake known as Small Sand Lake. Then there are tremendous big islands there which are 2 or 3 miles long and Big Sand Lake is behind them. It is really away from the river.

Mr. LAIRD. What is the width of Big Sand Lake?

Mr. RICHARDSON. I understand it is 10 miles to the northern end of Big Sand Lake and it is about 2 or 3 miles across, but that is not in the river proper.

Mr. LAIRD. Are there any campers down there?

Mr. RICHARDSON. On Big Sand Lake, no.

Mr. LAIRD. Little Sand Lake is smaller, and it is occupied with campers?

Mr. RICHARDSON. Of course, the islands are situated between the river and Little Sand.

Mr. LAIRD. For the benefit of the commission who have not seen the district, generally speaking, the islands are very much the same as the islands in the Lake of the Woods, except that they are more rocky and higher. That is, the whole district is a network of water and islands.

Mr. RICHARDSON. A network of water and islands; yes, sir. I do not think the elevation of water would affect us in any way by drowning the islands, so to speak.

Mr. TAWNEY. Mr. Hilton, are you ready to go on with the representatives from Minnesota who are here for the purpose of presenting facts with regard to the ditch system of Beltrami and Roseau Counties?

Mr. HILTON. I am not, so far as those counties are concerned. I also understand that at the hearing previously had by the commission certain statements were made relative to county ditches, judicial ditches, and State ditches, and that a request was made upon the



governor of Minnesota, who is a member of the State drainage commission, that he have here the State drainage engineer to explain to the commission, if they desired such information—and I understand they do—the system of drainage in Minnesota. There is a difference between the county ditch, the judicial ditch, and the State ditch systems. If the commission desires, Mr. Willard is here and will submit information on this subject.

MR. CAMPBELL. Would it be convenient for him to wait until to-morrow?

MR. HILTON. I think that it will not take him over 15 minutes.

MR. CAMPBELL. We expect a Minnesota gentleman to be in town to-morrow and I was going to ask his advice and his attendance here.

MR. TAWNEY. I understand that Mr. Willard, the State drainage engineer, is here only for the purpose of putting into the record an explanation for the commission as to the differences between the three systems of drainage in Minnesota. I thought Mr. Willard could give that testimony now and could then go home.

MR. HILTON. Yes; and if it were indicated to him that he should stay any longer I apprehend that he could do so.

MR. ANDERSON. Before we take up any new business I would like to say a word with reference to the camping situation; perhaps it would benefit some of the commissioners. There are other summer resorts for the people of the city of Winnipeg besides the Lake of the Woods and Minakee. As a matter of fact, the popular summer resort of the people of the city of Winnipeg is along the southern shores of the Lake of the Woods. There is an unlimited area of land there for summer-resort purposes and the majority of the people of the city of Winnipeg go there for that purpose. I suppose at a conservative estimate there are 10 people who go to Winnipeg Beach to 1 going to Kenora and Minakee combined. There are also other new beaches being opened up on the south shore of Lake Winnipeg. The present beaches, Winnipeg, Whitewold, and some others, are upon the west side of the mouth of Winnipeg River. There are other extensive tracts proposed to be opened up in the near future on the east side of the river.

To sum it up, the summer resorts on Lake Winnipeg are the resorts of the Winnipeg people and the resorts on the Lake of the Woods and Minakee are for the opulent. I am not attempting for a moment to detract from the merits and advantages of the Lake of the Woods and Minakee as camping and summer resorts; I do not think they can be excelled, but I just want to point out that there are other places where the people of the city of Winnipeg go which are more convenient. The Winnipeg beaches are approximately 50 miles from the city of Winnipeg.

MR. LAIRD just reminds me that a number of people from Winnipeg—I do not know that I should say this because it does not seem very patriotic—go to Detroit Lakes, in the State of Minnesota, but, after all, I do not think they should be taken into consideration.

#### TESTIMONY OF MR. E. V. WILLARD, OF ST. PAUL, MINN.

MR. MIGNAULT. Before you begin, Mr. Hilton, may I ask whether it is your intention to offer any testimony as to the engineering features of the drainage system of Minnesota?

Mr. HILTON. I did not understand that Mr. Willard was here for that purpose, and, so far as I know now, my answer would be no, but something might develop during this hearing that would bring me to offer such testimony if I thought the interests of the State required it. So far as the record shows now, I do not see that there is any necessity for it.

Mr. MIGNAULT. The reason I mentioned it is this: As you will recall, when Mr. Tawney and myself were at International Falls some emphasis was laid on the fact that raising the level of Rainy Lake would interfere with the drainage system. When we were at Warroad one drainage constructor gave his evidence—Mr. Bourgeois—and he appeared to assume that the level of the Lake of the Woods would not be any higher than 1,055, if I recollect correctly the figure, and his whole drainage in that country was based on that assumption. Personally, I would have been very pleased if we could hear what we might consider an authoritative statement of the policy of your State, especially of that section of your State, with regard to drainage. It may have some bearing, and I think it will have considerable bearing, in the consideration of the question of the levels of the Lake of the Woods on the levels of Rainy Lake.

Mr. TAWNEY. For your information, Mr. Mignault, I would say that the way this question arose here was that Mr. Dent, the referee in ditch matters of Beltrami County, living at Bemidji, wrote to me some time after the close of the hearing last September and wanted to know if the people who were interested in the ditch systems of Beltrami and Roseau Counties could be heard here at this time. I communicated with Mr. Magrath and Mr. Gardner, the chairmen of the commission, and it was arranged to have them present at this time such data and information as they wanted to bearing upon the lake levels as affecting the drainage system of those two counties. We understand that Mr. Dent is here, although I have not met him. That is how we came to give any consideration whatever to the question of the ditches in northern Minnesota. There are three different systems of ditches in Minnesota, and it is for the information of the commission, rather than for the benefit of the State, that Mr. Willard has been sent up here to explain to us the three different systems under which ditch construction is carried on in that State.

Mr. HILTON. You are correct in that statement, Mr. Tawney.

Mr. TAWNEY. But, so far as concerns hearing the people in Beltrami and Roseau Counties, with respect to the ditches actually constructed or in process of construction, the request for that hearing came from Mr. Dent, who, I am imagine, is here prepared to go on with the presentation of such evidence as he desires to offer at this time. I make this suggestion so as to clear the thing up, and in order that we may hear Mr. Dent and his witnesses, if he has any evidence to present.

Mr. HILTON. Commissioner Mignault's statement, as I understood it, was in relation to the Lake of the Woods and the drainage systems in that lake, concerning which testimony was offered at a previous hearing held at Warroad.

Mr. MIGNAULT. Yes; that is correct.

Mr. HILTON. Mr. Willard is perfectly qualified to go ahead and furnish the commission, without being interrogated, the information that you desire, and he will probably in that way make the record



shorter. With your permission, he will explain to the commission the three systems of drainage under the Minnesota laws.

Mr. WILLARD. That will be the question, then, to explain that?

Mr. TAWNEY. Yes.

Mr. WILLARD. The law which provides for the construction of county and judicial ditches is substantially the same in both instances. In fact the original act, chapter 230 of the General Laws of 1905, embraces the two systems. The only difference in the two proceedings is that in the case of a county ditch the board of county commissioners has jurisdiction, and in the case of a judicial ditch the judge of the district court has jurisdiction. In the case of a county ditch the petitioners desiring the establishment of a county ditch petition the board of county commissioners, and they act. In the case of a judicial ditch the petitioners petition the judge of the district court. The county-ditch law is intended to cover proceedings wholly within one county. The judicial ditch law may or may not apply to a problem within one county. In fact that was the object of the judicial ditch law—to apply to cases where the proceedings would affect more than one county. The proceedings in respect to both the county and judicial ditches are initiated by a petition signed by one or more interested property owners. Such petitioners must furnish a bond to guarantee the payment of all preliminary expenses incurred previous to the final hearing on the ditch, in case the power having jurisdiction should find that they would have to disallow the petition. Those are the points on which the ditches differ. I do not know whether the commission wishes me to go into all the steps of the proceedings.

Mr. MIGNAULT. When it is decided to construct a ditch for drainage purposes, is the construction carried on under an engineer or a board of engineers, or, if not, how is it done?

Mr. WILLARD. At the preliminary hearing if the board of county commissioners or the judge of the district court find from the evidence produced at the hearing that the ditch will be of public benefit and promote public health, the county board or the court will appoint an engineer. The said engineer will furnish a bond for the faithful performance of his duties, and he will proceed to make the necessary surveys to prepare plans and specifications, such surveys and such plans being based upon the petition. He files his report. Within three days of the filing of the report a board of viewers is appointed. They go out and appraise the benefits to be derived from this ditch and they assess such benefits against the benefited lands.

Mr. HILTON. How many viewers are there on the board?

Mr. WILLARD. Three.

Mr. MIGNAULT. Are the plans submitted to any authority for confirmation, or is that left to the engineer?

Mr. WILLARD. It is left to the engineer and, of course, the court having jurisdiction has a right to recommend any changes.

Mr. TAWNEY. Does the engineer construct the ditch according to his own plans or according to a plan submitted to the county commissioners for approval?

Mr. WILLARD. It is virtually submitted for approval to a court or board of county commissioners.

Mr. TAWNEY. Does the law require the approval?

Mr. WILLARD. The board of county commissioners or the court orders the ditch constructed according to the engineers' and viewers' reports as submitted by the engineers and viewers or as amended at the final hearing.

Mr. MIGNAULT. But the engineers have nothing to do with the plan of construction; it is merely an assessment of cost.

Mr. WILLARD. They have nothing to do in an advisory way, but they can recommend changes. When they assess their benefits they can recommend that certain changes be made in the engineers' report to comply with the desires of some of the petitioners who have suggestions to make.

Mr. ROCKWOOD. May I make a suggestion which I think states the matter accurately? The engineer is the technical adviser of the court or of the county commissioners, as the case may be.

Mr. WILLARD. Yes, sir.

Mr. ROCKWOOD. But the engineer does not make the effective legal order of adoption or approval. The relation is similar to the relation of your own consulting engineers to your commission, they recommending and you having confidence in their recommendation, but are at liberty to make suggestions as to changes. Am I right, Mr. Willard?

Mr. WILLARD. Yes, sir.

Mr. MIGNAULT. Is there a settled policy as to the construction of these ditches; for instance, as to the amount of fall per mile, or anything of that kind?

Mr. WILLARD. No, sir; the law does not define that.

Mr. MIGNAULT. I presume, then, that in each case the engineer plans such a ditch as he thinks is proper.

Mr. WILLARD. Of course, the engineer must necessarily make his plans conform to the contours of the country within a certain limit.

Mr. MIGNAULT. To bring it down to a concrete case; certain of these ditches were constructed discharging into the Lake of the Woods. What authority, if any, pronounced on the plan of construction of these ditches before the construction began?

Mr. WILLARD. The date of the final hearing is advertised in one or more papers of the county and written notices sent to all nonresident landowners liable to be affected. The object of the law is to give the utmost publicity to the people who are interested in the matter or who would desire to appear at the hearing. They may either appear in person or have counsel present to represent them.

Mr. MIGNAULT. We have a case in point. One of these ditches was constructed leading into the Lake of the Woods, and the engineer told us that he assumed that the highest level of the lake would not be above, I think, 1,055. If it were above 1,055, the whole construction of the ditch would be useless. Therefore, I would like to know, for my information, whether there is any authority which pronounces on these plans before this expensive work is undertaken.

Mr. WILLARD. I am not qualified to answer that question. I do not know anything about the particular ditch or how it was planned. If he assumed that the Lake of the Woods was of a certain elevation he must have had ground for making that assumption.

Mr. MIGNAULT. Well, he had none whatever.

Mr. WILLARD. If he did not have any grounds for making that assumption, or if he—well, I do not want to answer that question.



Mr. TAWNEY. Are there any State ditches in Beltrami County leading into the Lake of the Woods?

Mr. WILLARD. Not directly.

Mr. MIGNAULT. Is there a difference between a State ditch and a county ditch?

Mr. WILLARD. Yes, sir.

Mr. TAWNEY. You are the State drainage engineer?

Mr. WILLARD. Yes, sir.

Mr. TAWNEY. You have nothing whatever to do with judicial or county ditches, have you?

Mr. WILLARD. No; not in my official capacity.

Mr. TAWNEY. All the ditches, then, leading into the Lake of the Woods are either judicial or county ditches.

Mr. WILLARD. If any ditches discharge directly into the Lake of the Woods they are either county or judicial ditches. By that I do not mean to say that the waters from State ditches do not find their way into the Lake of the Woods. We have drainage ditches that empty into the Big Fork and Little Fork Rivers, and the waters of those rivers ultimately find their way into the Lake of the Woods.

Mr. TAWNEY. But they do not empty directly into the lake.

Mr. WILLARD. No, sir.

Mr. GLENN. Do you know anything about these ditches at Warroad?

Mr. WILLARD. Between Warroad and Roseau?

Mr. TAWNEY. No; between Warroad and the mouth of Rainy River.

Mr. WILLARD. No, sir; I do not.

Mr. GLENN. You have never examined them?

Mr. WILLARD. I have never examined them.

Mr. GLENN. When I was there it looked to me as though they were useless.

Mr. MIGNAULT. Mr. Willard, can you describe to the commission the methods of constructing ditches, especially as to the size of the slope of representative ditches in flat or swampy country?

Mr. WILLARD. As stated before, the plans will depend entirely on the slope and contour of the country. We make use of whatever fall we get. We can to a certain extent make a fall by increasing the depth of the ditch as we approach the outlet, if we have a proper ditch, but in many instances we have to make the grading of the ditch conform to the slope of the surface of the swamp. For instance, what is known as the Big Roseau Swamp in this State is a marsh that extends from—well, the watershed between the two rivers and the Roseau River and north into Canada. There has been considerable ditching done in this marsh. The fall of the lateral ditches averages about 1 foot per mile, and the fall of the main ditch ranges from a foot per mile to two and a half feet per mile. Of course, it is a large swamp and it is impossible to make very much more fall than what is already found in the surface of the marsh.

Mr. TAWNEY. Where does that empty?

Mr. WILLARD. Into the Roseau River.

Mr. TAWNEY. And the Roseau River empties into the Red River?

Mr. WILLARD. Yes, sir.

Mr. MIGNAULT. I assume that unless you have a possible outlet, that is to say, an outlet where the waters of the ditch can be discharged, it would not be good practice to construct a ditch merely to empty the water on the higher lands onto the lower?

Mr. WILLARD. No; I would say not.

Mr. HILTON. It would not be necessary, Mr. Willard, for an engineer employed on a ditch project to know what the actual level of the Lake of the Woods or any other lake was as compared to sea level in order for him to plan and have constructed a proper ditch.

Mr. WILLARD. No, sir.

Mr. HILTON. That is, he could start at the head of the ditch with any figure that he might see fit to use, say 100, and run his ditch to the outlet without knowing what the sea level of that outlet was, as long as he had sufficient fall from the place where he started until he reached the point where the waters were to be discharged.

Mr. WILLARD. Yes, sir.

Mr. MIGNAULT. Yes; of course, it would be necessary for him to so arrange the slope of the ditch and the location of the outlet that it would be possible to get rid of the water coming down the ditch?

Mr. HILTON. Surely.

Mr. WILLARD. It would, but it is a quite common practice among the drainage engineers throughout this State, owing to the scarcity of bench marks, to begin their initial levels from a bench mark of an assumed elevation and base the entire system on this assumed level without reference to sea level.

Mr. MIGNAULT. But it would be necessary, at all events, to place the outlet in such position that the water could be discharged?

Mr. WILLARD. Certainly, that would be the object of his plan.

Mr. MAGRATH. Do you know how much territory is drained into the Lake of the Woods, Mr. Willard?

Mr. WILLARD. I can not say, because I have not the least idea how much county and judicial ditching has been carried on. There is a large swamp area tributary to the waters of Rainy River and the Lake of the Woods that will have to be drained into Rainy River as its outlet before the lands are reclaimed.

Mr. MIGNAULT. I understand that Mr. Meyer would like to put a question or two to Mr. Willard.

Mr. MEYER. I just wanted to ask Mr. Willard whether in a case where the elevation is assumed the levels are run over the complete proposed route of the ditch to the point of outlet and the profile of the ditch then planned in accordance with the available fall?

Mr. WILLARD. That is my practice.

Mr. TAWNEY. Is that the practice also of the engineers who plan and construct county and judicial ditches?

Mr. WILLARD. I do not see how they can plan the ditches basing their information on anything but their levels and the slope of the ditches. The discharge of the ditch is dependent upon its gradient and its cross-sectional area. It is necessary to know the gradient before the plan is adopted.

Mr. MAGRATH. Generally speaking, when are these ditches most in use during the season? Do they start in to carry off a heavy run-off at the opening of spring?

Mr. WILLARD. Yes. The tax to which a ditch is subjected in carrying off water depends upon the extent and the topography of



the drainage area. We have what is known as fast areas and slow areas dependent on the general fall of a country tributary to a ditch. Of course, a fast area will send the waters into the ditch in a shorter period of time, and it will raise the crest of the discharge faster, and it will subside faster, while in slow areas the water does not come to the ditch so fast and the flow will be more uniform and over a longer period of time.

MR. MAGRATH. What would you term that territory south of the Lake of the Woods, a fast or a slow area?

MR. WILLARD. I would not term it a fast area, and I would not term it an extremely slow area. It would not be a slow area when compared with the Roseau swamp, and it would be a slow area if compared with, say, the Root River in the southern part of our State. I would say it would be an average condition prevailing in the swamps of northern Minnesota.

MR. MAGRATH. Is the territory drained by the Roseau a fast area?

MR. WILLARD. It is a slow area, exceedingly slow.

MR. MAGRATH. So that ditches would be carrying water nearly all through the season?

MR. WILLARD. Yes; I would say that they would.

MR. MEYER. Mr. Willard, in connection with the Roseau swamp, for example, the question came up yesterday as to the height to which land above a certain water level would be affected through seepage. In that connection, by the way, the question was asked yesterday of Mr. White as to what his opinion was with respect to the height to which land would be affected above the level of standing water through seepage. In reply, as I recall it, Mr. White remarked that that would depend largely on the character of the soil, but that it might be stated as being in the neighborhood of from 1 to  $1\frac{1}{2}$  and possibly 2 feet. What has been your experience in connection with the inland lakes into which possibly some ditches discharge in the State of Minnesota and also, perhaps, in connection with the ditching of the Roseau swamp, as to the elevation to which land is affected above the level of standing water adjacent to the land?

MR. WILLARD. Of course, as stated, that will depend upon the character of the soil. I would say that in a highly vegetable soil the land lying between a contour 2 feet above the water surface will be affected more or less by the water table or the water underneath. The water standing near the surface will tend to keep the soil cold and soggy, and probably the only product that soil will produce will be lowland or meadow-land hay. In a sandy soil where percolation takes places readily I would say that the soil would not be affected so much by the water table, probably a foot and a half. I wish to have it made plain that this does not apply to lateral drainage; it applies to the effect on the soil of the water table underneath.

MR. MEYER. How would the effect compare in the case of a heavy impervious clay? How would the effect vary with the differences in rainfall and evaporation—that is, assuming the two conditions a very dry year and a very wet year?

MR. WILLARD. Of course, in a heavy impervious clay the evaporation will not take place as readily as in a soil of more light texture. This is purely a hypothetical case.

Mr. MEYER. I wondered whether the effect would be greater in the case of a wet year than in the case of a dry year. For example, supposing you had the addition of the heavy rainfall on the surface to a high-water table from below, would you consider the effect greater in that case than where the evaporation removes the moisture rather rapidly from the surface, as it does in a dry year, so that the supply underneath has to exceed the rate with which it is evaporated from the surface in order to affect the land above the surface of the water table?

Mr. WILLARD. Yes; I think it would have a greater effect.

Mr. TAWNEY. One of the drainage engineers, Mr. Bourgeois, appeared before the commission at Warroad, and testified as to the construction of ditches in Beltrami County, leading directly and emptying into the Lake of the Woods. Mr. Powell put the following question to him: "Your whole system is planned in view of, or as an adaptation to whichever you may put it, an elevation of 1,060?"

And the witness says: "We were using that as a basis at the time."

Then Mr. Powell said: "Your whole system, I understand, was adapted to that level. Your system was adapted to a level of 1,060 as the official system when the water was at that level?"

And Mr. Bourgeois said: "No, sir."

Then Mr. Powell said "What are we to understand?"

Mr. Bourgeois answers: "The water at an elevation of 1,060 would have been in between the banks, but I planned my ditches to two or three feet lower than that."

He took the elevation of 1,060 and planned the outlet ditches two to three feet below the level of the lake. Page 235 the same thing:

In order to have these ditches so as to operate effectively for draining the country, you would have to have the level at what stage?"

Mr. Bourgeois. 1,056.

I want to see if that is correct, if they had planned their ditches in Beltrami County three feet below the ordinary high water of the Lake of the Woods.

Mr. WILLARD. Assuming the ordinary high water of the Lake of the Woods to be 1,059, I think it was a good provision on the part of the engineer to plan his ditch below that water surface to take care of any fluctuations that might take place in the lake, and to make effective every possible fall there was to be had.

Mr. MEYER. And what effect would the 1,060 stage have on the discharge from that ditch?

Mr. WILLARD. Well, the waters through the ditch would discharge at an elevation of 1,060.

Mr. MEYER. Would the effect extend substantially farther back up the ditch than the point at which the water level intersected the bottom of the ditch?

Mr. WILLARD. If the ditch is designed with an outlet at 1,060, of course—I do not think you mean the question as you put it; will you repeat it?

Mr. MEYER. Perhaps I could explain it; assume this ditch coming down on my slope, irrespective of what slope that may be, whether 1 or 2 feet to the mile, or 3 or 4 or 5 feet to the mile, and it is discharging water into the lake; we assume it was planned to discharge, I was going to say at an elevation of 1,056, but I believe that would not be a correct interpretation of your previous answer to the ques-



tion, but assuming the ditch was planned as indicated by the testimony of Mr. Bourgeois, and that the lake levels were at 1,060 at any particular time when this ditch was discharging, would the effect of this increase of 4 feet in lake level extend farther back—that is substantially farther back up that ditch—than the point at which the bottom of the ditch raises above the level of 1,060?

Mr. WILLARD. If the ditch was designed to discharge at elevation 1,056 a certain condition prevailed at that point as regards discharge; if that elevation was raised to 1,060 the conditions which previously prevailed at 1,056 will prevail at elevation 1,060.

Mr. MEYER. And will the effect of that 4-foot raise extend farther than the point you have indicated; that is substantially farther up the ditch, or the back water, to express it in other terms?

Mr. WILLARD. Assuming there is 4 feet fall to the mile in the last 5 miles of this ditch, if the water was raised 4 feet then the 1 mile of that ditch, as far as the gradient was concerned, would be rendered ineffective absolutely, and if there was a large volume of water moving in that ditch and the ditch was of a large cross-sectional area I would say it would probably affect the discharge more than the cutting off of the fall, in that the momentum of the moving waters, provided they were moving on a straight line, would be reduced and the discharge correspondingly reduced.

Mr. MIGNAULT. And it would become choked up with silt?

Mr. WILLARD. I would say the ditch would not be choked up with silt any more, or not very much more, than it would be choked up right in the lake at elevation 1,056.

Mr. MEYER. The choking would occur at 1,060 as against 1,056?

Mr. WILLARD. Yes; and substantially the same conditions would prevail.

Mr. MEYER. Approximately how far would this back water extend? Would it be a quarter of a mile?

Mr. WILLARD. It would affect the discharge at the mouth of the ditch, but how far up it would affect it is a matter which would be difficult to arrive at in actual figures. It is something, in my mind, which is intangible. It could be arrived at by experiment. I have not gone into it in detail and I can not answer it.

Mr. MEYER. Is it similar to the back water effect in the construction of a dam?

Mr. WILLARD. Practically so. Of course, a small ditch can hardly be compared with a large stream. A small ditch with a cross-sectional area of 40 to 50 feet in width can hardly be compared with a stream of a thousand feet cross-section.

Mr. MEYER. Would the effect be comparatively greater in a large stream than in the small ditch?

Mr. WILLARD. I should think so.

Mr. KEEFER. Referring to your answer to Mr. Meyer about the effect on highly vegetable soil of being covered with water. If the fact was that the water was only held there for a short period, say six weeks and not longer, and then came back to other levels, what would be the state of that soil after that?

Mr. WILLARD. The soil would be the same, but as the water recedes it gives a better opportunity for lateral drainage, and that soil would be in a better condition to produce highland crops.

Mr. KEEFER. So that the duration of the time the water is held up is an important factor?

Mr. WILLARD. Not so much the duration as the time of the year at which the stage of water is at its height.

Mr. KEEFER. Which particular time of the year, after the crop season or before it?

Mr. WILLARD. I would say that if the water stands high in the ditch at the time the farmer wants to plant his crop; it renders the soil soft. He can not go on there with his implements and teams, and if he should have time to put the crop in, and the water should afterwards rise when the crop is near the point of maturing, it would again affect the crop seriously.

Mr. KEEFER. Even though it receded in a short time?

Mr. WILLARD. The shorter the time the less the danger.

Mr. KEEFER. What length of time would you say would be detrimental, approximately?

Mr. WILLARD. I think that is testimony that belongs to agricultural experts.

Mr. KEEFER. I value your testimony very much, and I want to get as much information as I can before you go, and if you can not answer it, I will not press it. I asked Mr. White the questions yesterday and he said "Commentators differ."

Mr. WILLARD. You know that would depend upon the crops. Some crops want moisture and some do not.

Mr. KEEFER. Give us all the light you can while we are on the subject, and then drop it.

Mr. WILLARD. I am not qualified to give testimony.

Mr. WHITE. You have used the expression "highly vegetable soil" as a standard; at least you have used that expression in illustration of seepage effects. Assuming you are familiar in general with the map, could you designate what classification of soil, as we have used it, would correspond to what you have termed "highly vegetable soil?"

Mr. WILLARD. Highly vegetable soil is called by some "peat," some "open marsh" and "bogs," some call it "muck."

Mr. WHITE. Similar to that west of Warroad?

Mr. WILLARD. Yes.

Mr. WHITE. Between Warroad and Lanby's farm; are you familiar with that?

Mr. WILLARD. No, I am not familiar with that; it is the classification I give to the Minnesota swamp lands.

Mr. WHITE. That would include the muskegs?

Mr. WILLARD. Yes.

Mr. KEEFER. Can you give me any idea of the volume of water brought down these ditches?

Mr. WILLARD. By all of the ditches?

Mr. KEEFER. Yes.

Mr. WILLARD. No, I can not.

Mr. KEEFER. I suppose it is natural to assume that in opening up these ditches it is going to change the suddenness of the rise of the lake, as against natural conditions without the ditches: you are going to throw into the lake considerably more water?

Mr. WILLARD. That is a subject that is disputed and discussed by practical drainage engineers, as to the effect of drainage on the



taxing of the capacity of streams used as outlets. I would say personally it will.

MR. KEEFER. I would think it would bring it in much more rapidly by having the ditches opened up, and you would get it all at once; I would like your opinion?

MR. WILLARD. The argument used against it by engineers is the fact that the marshes that are now a reservoir, and are saturated with moisture, when drained will become reservoirs that take up moisture, and that they will take up a considerable precipitation before they commence to discharge. That is the argument used against it.

MR. KEEFER. I should think that answer is quite sound. Can you follow that up by telling me what will be the area in acreage or mileage that your ditches will be tributary to the Lake of the Woods?

MR. WILLARD. No, I can not.

MR. KEEFER. And Rainy River?

MR. WILLARD. I have not given that any study.

MR. KEEFER. You do not know that?

MR. WILLARD. No.

MR. TAWNEY. Do you know the extent of the area of the watershed in northern Minnesota, from which waters flow into the Gulf of Mexico and the Mississippi, into the St. Lawrence through the St. Louis River, and into Hudson Bay through the Red River north? What is that area in extent? Those three rivers all rise in a comparatively small area?

MR. WILLARD. Yes.

MR. TAWNEY. With no perceptible divide. I want to get into the record the fact as to the extent of that level land, which is the source of these three great rivers flowing in different directions through the county?

MR. WILLARD. I worked up that data here some three or four years ago, and of course it is a very rough approximation, and I regret to state that I have not the faintest idea now what my results were.

MR. TAWNEY. In mileage?

MR. WILLARD. I can not give it to you.

MR. TAWNEY. Is it less than 100 miles?

MR. WILLARD. One hundred square miles.

MR. TAWNEY. One hundred square miles?

MR. WILLARD. In which particular drainage area?

MR. TAWNEY. I mean the drainage area for the source of all these four rivers?

MR. WILLARD. I misunderstood your question the first time. I have not made that study at all. I have not made any investigation. I understood you to ask me what the drainage area of the different watersheds was.

MR. TAWNEY. No, not the drainage area. I want to get that area within which the source of these rivers come. My recollection is that it is something between 70 and 100 miles across?

MR. WILLARD. I do not know.

MR. CAMPBELL. Given the same character of soil and slope above the water table, the amount of the seepage in vertical height would be the same, whether you have a height above the sea level of 1,062 or 1,056?

Mr. WILLARD. The same thing.

Mr. CAMPBELL. You have no profiles of that drainage area with you?

Mr. WILLARD. I have not.

Mr. CAMPBELL. But the two counties, Beltrami and Roseau, speaking generally, are medium-speed areas, neither fast nor slow?

Mr. WILLARD. I would say—this is subject to correction by other engineers—I would call the drainage area of the Roseau River an exceedingly small area.

Mr. CAMPBELL. You are speaking of the Roseau River?

Mr. WILLARD. Yes.

Mr. CAMPBELL. That is to the west?

Mr. WILLARD. Yes; that embraces most of Roseau County.

Mr. CAMPBELL. And that comes into Red River finally.

Mr. CAMPBELL. How about the territory near Warroad?

Mr. WILLARD. It is faster than Roseau.

Mr. CAMPBELL. This territory near Beltrami—I think Zippel Bay is the local name there?

Mr. WILLARD. I have not had occasion to examine into any of the profiles of the ditches that have been planned of that territory, and I can not recall now just what the fall is.

Mr. CAMPBELL. Mr. Bourgeois at the September sitting gave falls in the first mile of usually 7 to 9½ feet; then after that an average for 6 or 7 miles inland at right angles away from the lake shore, wherever it might be, of 2 to 7 feet to the mile.

Mr. WILLARD. I would consider a slope of that kind a reasonably fast area, not the fastest, but reasonably fast.

Mr. ANDERSON. What effect has the drainage system into the Roseau River, so far as floods are concerned, causing these floods?

Mr. WILLARD. The channel of the Roseau River was in its original state a very poor channel; in fact, the channel from the source of the Roseau, the headquarters in the northeastern portion, Marshall County, down to what is known as Roseau Lake, had a comparatively large gradient; but from Roseau Lake west it meanders through what is known as the large Roseau swamp, and the river was nothing more nor less than a depression in the marsh where the waters had forced themselves through the marsh and had only about three-tenths of a foot fall to the mile in the natural state.

Mr. ANDERSON. Then the drainage did have the effect of causing floods there and raising the water?

Mr. WILLARD. There has never been an opportunity to observe the effect of drainage on the Lake of the Woods. It has always been in a very poor condition; it is now being improved and dredged up.

Mr. ANDERSON. It did affect the quantity of water in it and raised the water?

Mr. WILLARD. Without having made any measurements by current meters, I would say it did affect it some.

Mr. ANDERSON. The Roseau flows into the Red River?

Mr. WILLARD. Yes.

Mr. ANDERSON. Have you heard complaints by reason of floods being caused by drainage into the Roseau and into the Red River?

Mr. WILLARD. I have heard of them, but none has been made directly to me.



Mr. HILTON. I understand that the raising of the water level in a body of water, whether it be a river or lake, in which a ditch discharges, the raising of the level of the lake or other body of water 1 foot, and therefore bringing the water up on the land contiguous to the lake a certain height, affects the drainage above the distance in which that water goes?

Mr. WILLARD. Oh, yes, it affects the land.

Mr. HILTON. And you tell us a minimum, as I understand you, of 2 feet, depending on what the nature of the soil was above the point to where the water went?

Mr. WILLARD. Yes.

Mr. ANDERSON. If it were of a highly vegetable nature, and had the properties of a spongy substance, it would go further, on account of capillary attraction, than it would if it were a sandy soil substance?

Mr. WILLARD. Yes.

Mr. CAMPBELL. To return to a former question of my own: But if the conditions at the lower level where the water started to raise were the same as above, the seepage would there be the same too; you would start with a certain amount?

Mr. WILLARD. Yes. If I could be permitted to make an explanation: I think that nature or Providence, whatever you wish to call it, has provided banks on rivers and lakes, which provide, or will take care of a reasonable fluctuation, without injuring or without flooding the banks; for instance, the difference between extreme natural low water in the lake and a reasonably high level can be taken care of by the banks, and that if the level of the lake is permanently raised by some controlling structure at the outlet, say of 3 feet, the effect on the surrounding lands would not be so disastrous in proportion as if the lake were permanently raised 4 feet; every foot that the lake is raised, I think, increases the area disproportionately.

Mr. CAMPBELL. But does it increase it out of proportion to the area that the water rises over the land and submerges the land?

Mr. WILLARD. The higher the stage of the water in the lake, the nearer the point of the general elevation of the land bordering on the lake the water will rise.

Mr. CAMPBELL. It must have been the case for many years back, from whatever cause we need not inquire, that a large part of the shore of that lake has not had a defined bank?

Mr. WILLARD. I am not qualified to answer that.

Mr. CAMPBELL. You do not know about that?

Mr. WILLARD. No.

Mr. KEEFER. Referring to your opinion, it seems reasonable, as to the effect of throwing the water in slowly. Take a concrete example: Take the Roseau River we are speaking of; I think they have straightened that and made a new channel of that for about 20 miles.

Mr. WILLARD. We are working at that now.

Mr. KEEFER. The effect of that, I am told, was to so suddenly bring the waters of that district—we will treat it as a large ditch—to so suddenly bring the waters of the Roseau into the Red River that you gagged and choked the Red River and caused the complaints spoken of?

Mr. WILLARD. I do not know.

Mr. KEEFER. I am told those are the facts; you do not know?

Mr. WILLARD. No.

Mr. KEEFER. But if they happen to be the facts, it would confirm your judgment on that point?

Mr. WILLARD. I would say it would have some effect on the discharge from the Roseau River into the Red.

Mr. HILTON. I understand from your statement that by the maintenance of water in the lake at its normal level, whatever that may be, for a long period of time, the difference between high and low water of the lake causes banks to be formed and certain soil conditions that have a tendency to form a basin that retains the water and prevents it from going back into the soil adjoining the lake?

Mr. WILLARD. That has been my personal experience.

Mr. HILTON. Nature or Providence works the matter out that way?

Mr. WILLARD. Yes.

Mr. HILTON. Now, when you raise the water above this basin where the soil and bank conditions are as I have indicated, and the water goes over on to land beyond the banks, ordinary soil, then the seepage up through there is much more in proportion than is the amount that works through the bank into the adjoining soil?

Mr. WILLARD. Yes.

Mr. HILTON. No question about that?

Mr. WILLARD. No.

Mr. KEEFER. Still referring to that, if that was the condition of the Roseau, you would expect the same condition in the Lake of the Woods, when you get these large ditches opened up?

Mr. WILLARD. I can not conceive that the drainage ditches could affect the stage of a body of water as large as the Lake of the Woods. It would probably affect it in a measure, but very slightly, compared with the effect on the river channel.

Mr. KEEFER. That is a question of what the drainage supply is, and so on?

Mr. WILLARD. Yes, the question of precipitation.

Mr. POWELL. What is the general character of the surface of the soil on the southern borders of the lake?

Mr. WILLARD. I do not know. I have not made any examination of this.

Mr. MAGRATH. Have you any ditches under your control where the fall is as much as 7 feet in a mile?

Mr. WILLARD. Not for the entire project. I have in mind some projects where the fall in the last mile is between 5 and 10 feet.

Mr. MAGRATH. I would like to know what effect such a fall would have on your ditch?

Mr. WILLARD. I would say this; that in loose sandy soil erosion will take place in a ditch of the size ordinarily constructed, with a fall of 4 or 5 feet to the mile; the fine substance will be eroded.

Mr. TAWNEY. Did you put in any structures, in the shape of drops, to obstruct the fall?

Mr. WILLARD. No, but after erosion has taken place the finer part of it will be washed out and the bed will become set with the coarser gravels and stones and prevent further erosion, as a rule.

Mr. POWELL. Like the gravel in the mountain streams?

Mr. WILLARD. Yes.



Mr. HILTON. You were called in primarily to explain the different systems of drainage in Minnesota and you have satisfactorily explained the county and judicial drainage system. Now, if the committee desires to know generally how the so-called State ditches are planned, Mr. Willard can furnish that information.

Mr. TAWNEY. Personally, I do not know that it is material, but I asked him if there were any State ditches draining into the Lake of the Woods, and I understood him to say there were not.

Mr. HILTON. I may say that Mr. Willard's department gets out in pamphlet form a copy of the drainage laws of the State, which not only describes the different ditches and the manner of the proceeding in establishing them, but also all the remedies that are allowed the property owners who are affected, and this is one copy. The pamphlets are about out of print, but Mr. Willard is about to prepare a new pamphlet containing all the drainage laws up to date and, if it be the desire of the committee, we will be pleased to send to the secretary of each section a copy, which will give you the information.

Mr. TAWNEY. You might send them up to each section.

Mr. HILTON. We will do that, and that will give you all the information Mr. Willard could give you and other information.

Mr. POWELL. Speaking of vegetable soil, I suppose that varies in consistency or hardness from the ordinary loose vegetable mold to coal itself?

Mr. WILLARD. I did not have in mind coal; I had in mind the soils we had in Minnesota.

Mr. POWELL. But it is found in almost every stage from the one to the other?

Mr. WILLARD. Yes.

Mr. POWELL. As a general thing, the consistency or hardness increases, according to height above the water, does it not? Coal must have earth above it.

Mr. WILLARD. Well, the class of soil that I have in mind is the soil that is found in our marshes in Minnesota. It is vegetable loam, peat, muck, whatever you want to call it, underlaid with a subsoil of clay or sand, and it ranges in depth from 6 inches to probably 16 feet in some places, and it is quite uniform in texture. In its natural condition it is almost entirely submerged in the water, and the texture of the swamps is almost uniform.

Mr. POWELL. The higher that soil is, as a general proposition, the less susceptible it is to seepage and capillary attraction?

Mr. WILLARD. The higher above the soil; yes.

Mr. POWELL. Then with a level of 1,060 you would expect the seepage to be more than at a level of 1,064, would you not—the effect on the surrounding soil, relatively?

Mr. WILLARD. Yes; relatively.

Mr. MAGRATH. I understand Mr. Dent wishes to make some statement.

Mr. O. L. DENT. I got in very late last evening, and I have not had time to go over some matters, and before we present our statement pertaining to the fifteenth district, I would like to have a little time this afternoon to go over them. Possibly some of the other parties could go ahead and that would give us time to prepare certain information.

Mr. TAWNEY. Unless we entirely change the plan of the hearing and go back to the water powers, I do not see——

Mr. DENT. I have been in court five days in another part of the country, and I have not had time to go over the data with some people that I would like to see.

Mr. MIGNAULT. You propose to present some evidence here?

Mr. DENT. I desire to present statements of assessments and would like to present to the commission the view that the viewers take in making the assessment and explain our system in building these ditches, and the effect of the high water on the muskeg and mucky soils as we see it, and as it has been presented time and time again to the different courts in the district.

Mr. TAWNEY. You are familiar, are you not, with the testimony taken in Warroad with respect to ditches in Beltrami County?

Mr. DENT. I have that testimony.

Mr. TAWNEY. Do you intend to offer any evidence contradicting that?

Mr. DENT. No; I offer more evidence. Mr. Bourgeois is here and he will probably go into the details a little more.

Mr. TAWNEY. In what respect will it be of assistance to the commission in arriving at a conclusion in regard to the levels?

Mr. DENT. I believe there is nothing said in the report about the soundings that were taken of the muck on top. I consider the soundings one of the most important phases of the drainage—the amount of the muck over the subsoil. It should be the governing point in your drainage.

Mr. TAWNEY. Is that information not contained in the report of the consulting engineers?

Mr. DENT. I do not know whether they cover the soundings or not.

Mr. TAWNEY. You have the report, have you?

Mr. DENT. I have it, but I have not had time to go over it entirely. There are sixty-four of these projects, about seven million dollars' worth, and I have been pretty busy, and I have not had time to go into it as thoroughly as I would like to.

Mr. TAWNEY. Have you further testimony here as to the soundings?

Mr. DENT. I think Mr. Bourgeois has the profiles along that district.

Mr. TAWNEY. Could that not be given in evidence?

Mr. DENT. I could offer that in evidence and give it to you.

Mr. POWELL. I think it is better for gentlemen to put in their case as they see fit.

Mr. DENT. I am not going to cover any more ground than I have to.

Mr. MAGRATH. You can get it ready this afternoon?

Mr. DENT. Yes.

Mr. KEEFER. How would it do to ascertain if there are any other phases to be urged in the case, and if there are none, then it would be very beneficial, I think, to the engineering staff to hear Mr. Meyer, and then let these other cases come on after Mr. Meyer, and it will give us an opportunity to digest Mr. Meyer's statements. There would be no loss of time that way.

Mr. BERKMAN. It would be very agreeable to have Mr. Meyer proceed, and in the meantime Mr. Dent could get ready.



Mr. MAGRATH. Are there any other interests represented here outside those Mr. Berkman has referred to and the water powers? The question of drainage, I understand, has to be taken up?

Mr. KEEFER. What position are we in in regard to Warroad, outside the question of power?

Mr. BERKMAN. In regard to Warroad, a sanitary survey or report has been made; I do not know where the original report is, but a copy was sent me, and maybe we can locate the report.

Mr. TAWNEY. The original is on file in the office of the board of health, St. Paul, and the commission has a copy of the report, and also a copy of the report of our sanitary engineer who made the survey.

Mr. POWELL. Do you purpose to pursue that matter any further?

Mr. BERKMAN. No.

Mr. KEEFER. Then there is no further evidence coming from there, outside of the power companies.

Mr. CAMPBELL. We will want to inspect that report and offer some evidence maybe.

Mr. TAWNEY. I have just this suggestion with respect to the report of the State board of health and also the report of the consulting engineers that they be received some time during the hearing and made a part of the record.

Mr. MAGRATH. Mr. Meyer will do that now.

Mr. KEEFER. Just as Mr. Campbell pointed out, as this report is going in with some part of the case, it might require to be answered; we cannot tell till we have investigated.

Mr. CAMPBELL. I do not think we will delay the session. We can have it examined by a professional man who will give his opinion to you before you leave Winnipeg.

#### STATEMENT OF MR. A. F. MEYER, OF MINNEAPOLIS, MINN., CONSULTING ENGINEER, INTERNATIONAL JOINT COMMISSION.

Mr. MEYER. In the text of our report we refer very briefly to the possible effect of regulation of the level of the Lake of the Woods on the question of storage and drainage at Warroad. After discussing the matter further with the commission and with their cooperation and consent, a sanitary engineer, Mr. L. P. Wolff, of St. Paul, Minn., was appointed to make a complete examination on the ground and report to the commission. His report has been received, and I believe it will not be necessary to read any portion of it, even the conclusions, but merely to offer the report in evidence, so that those who are interested can examine it, as I understand they desire to do. The report is as follows:

REPORT SHOWING THE EFFECT OF REGULATING THE LEVEL OF THE LAKE OF THE WOODS UPON THE INSTALLATION AND OPERATION OF SEWAGE AND THE DISPOSAL OF SEWAGE AT WARROAD, MINN., BY L. P. WOLFF, CONSULTING ENGINEER, ST. PAUL, MINN.

ADOLPH F. MEYER AND ARTHUR V. WHITE,

*Consulting Engineers, International Joint Commission.*

GENTLEMEN: In compliance with the instructions contained in the memorandum accompanying your letter of November 22, 1915, I have made an investigation of the conditions at Warroad, Minn., affecting the installation and

operation of sewers and the disposal of sewage, and beg leave to submit the following report:

#### GENERAL CONDITIONS.

The village of Warroad is located on comparatively level ground at the mouth of the Warroad River, the location of the buildings and the streets which have been opened and the general topography being shown on sheet 10 of the atlas accompanying your report to the commission. The principal business houses and a large portion of the residences are on the north side of the river east of the railroad tracks, the surface of the ground in this section of the village being highest adjacent to the railroad and having a gentle slope toward the northeast to the Lake of the Woods. The remainder of the buildings, consisting mostly of residences, are west of the railroad, being located partly on the north and partly on the south side of the river, the surface of the ground in these two sections draining toward the river.

The information at hand indicates that the soil below the surface covering is a clay which is quite impervious and which extends to a greater depth than that to which any excavation for sewers would be carried. This condition is indicated by the excavations already made for basements and for existing sewers and by well borings. On account of the comparatively flat surface and the character of the soil, the storm water does not readily drain off on the surface and is retained by the clay subsoil, and for this reason basements are apt to be damp or wet, especially during periods of heavy rainfall. Under these conditions the construction of modern buildings with suitable basements will require the installation of an adequate system of sewers to remove the domestic sewage and the ground water which would seep into the basements, and also proper provision for the prompt removal of storm water from the surface.

There are two general systems of sewerage in common use, known as the "combined system" and the "separate system." In the combined system, both the sewage proper and the storm water are carried in the same set of pipes, while in the separate system, one set of pipes, generally called "sanitary sewers," is provided for the removal of the domestic sewage and the ground water which seeps into basements, and the storm water is removed in separate pipes or by means of surface gutters and ditches.

In the separate system, the sanitary sewers should be placed low enough to drain the basements while the storm water sewers need be placed only low enough to drain the street gutters and to secure the required fall.

The elevation of the ground surface at Warroad above the level of the Lake of the Woods is so small that the outlets of any system of sewers in which the sewers are deep enough to drain the basements will be submerged a considerable portion of the time under natural conditions and nearly all of the time under the conditions of regulated lake levels, specified in your memorandum. As the discharge from such sewers must be pumped whenever the outlets are submerged, the separate system of sewerage should be adopted in this case, the storm water sewers, if any, being limited to those sections where their outlets can be placed above the ordinary maximum lake level in order to reduce the amount of pumping required to a minimum. The outlet of all sewers should discharge into the Warroad River, first on account of its proximity, resulting in a minimum cost and depth as compared with an outlet into the Lake of the Woods, and second because the outlets can be better protected against damage from ice and other causes.

In order to prevent seepage of ground water into basements, all basements should be underdrained by placing a layer of gravel or other porous material under the basement floor and laying two or more lines of drain tiles, embedded in the gravel. The drain tiles should discharge into a small basin from which the water should discharge through a trap and back water valve into the house connection to the sewer. This provision for the removal of ground water is made necessary primarily on account of the lack of surface drainage and the character of the soil and should be made regardless of whether any regulation of lake levels is adopted or not.

Basement floors should generally be at an elevation of 2.5 feet above the invert of the street sewer. Basements in the business district, which are used for the storage of goods, should have a clear height of about 7 feet, and those used for shops a clear height of 8 feet. Assuming that the practice already adopted in Warroad of elevating the ground floors from 1 to 2 feet above the walk is to be followed, and allowing for 1 foot for the thickness of the ground-



floor, the depth of the main sewers in the business district should not be less than 9½ feet below the sidewalk grade.

Basement floors in the residence districts, where heating plants are installed, should have a clear height of 7 feet. The material excavated from the basements should be spread around the building, making the grade line at the building from 6 inches to 12 inches above the sidewalk and the first floor should be at an elevation of 3 feet or more above the grade line. Allowing one foot for the thickness of the first floor, and 2½ feet fall from the basement floor to the main sewer in the street, the depth required for the main sewer, below the street grade, would be about 6½ feet.

#### EXISTING SEWERS.

In 1914 10-inch sanitary sewers were constructed on Main and Wabasha Streets between Lake and McKenzie and on Lake and McKenzie between Main and Wabasha with an outlet running south from the intersection of Main and Lake Streets to the Warroad River. These sewers were intended to serve the business district, and a part of the business houses have been connected to them.

Before reaching the outlet the sewage passes through a settling tank in which the coarser matters in suspension are settled out, the effluent from the settling tank being collected in a receiving well from which it is discharged by means of a 4-inch Schutte and Koerting ejector through the outlet pipe into the river. The elevation of the invert of the inlet pipes where it enters the settling tank is 1,058, and the elevation of outlet pipe is 1,062.6.

The effluent from the settling tank could have been discharged by gravity into the river whenever the lake level is 1,058 or less, but no provision was made for doing this either in the plans or in the construction, and under present conditions, therefore, the sewage must be discharged by the ejector at all times.

The efficiency of the ejector is very low, the efficiency claimed by the manufacturers under favorable conditions being less than 10 per cent, and the efficiency in actual service, according to information furnished by the superintendent of the Warroad Water and Light Plant, being considerably less.

A more efficient apparatus should be installed to take the place of the ejector, the ejector being retained for emergency use only. Such apparatus should preferably consist of a vertical centrifugal pump direct connected to a vertical motor, the pump to have an average capacity of 300 gallons per minute against the variable head under which it will operate. The pump should be automatically controlled by a float switch which should be adjusted so that the lift of the pump would vary from 5 to 15 feet, with an average of 10 feet. The combined efficiency of the pump and motor under these conditions would be about 40 per cent, but to allow for loss of efficiency due to wear and other causes, I shall assume an over-all efficiency of 33½ per cent. With an average capacity of 300 gallons per minute and an average head of 10 feet, the average power required with the pump in operation, will be 2.25 horsepower and to provide for the maximum load, a 3-horsepower motor should be installed.

No accurate data are available in regard to the discharge from the existing sewers, but from my inspection and information furnished by the superintendent, I estimate that the average discharge of sewage and ground water combined, can not exceed 30 gallons per minute or one-tenth of the capacity of the pump recommended, so that the pump would be in operation on an average one-tenth of the time or 876 hours per annum. The average amount of current consumed by the motor would be 1.7 kilowatts and the amount consumed per annum would therefore be 1,489 kilowatt hours, assuming that all of the sewage is pumped.

Referring now to the questions asked in your memorandum, I should say that the cost of the installation of the existing sewage system would not be affected by any method of regulations which the conditions outside of the business district will permit as the size and depth of the sewers and the pumping equipment required would be the same in any case.

The cost of operation, however, would vary with the period during which pumping is required as follows:

(a) Under natural conditions the sewage would have to be pumped only when the lake level is above elevation 1,058, which, according to your plate 139, would be 25 per cent of the time, requiring, according to the estimates given above, 372 kilowatt hours per annum.

According to your report, extreme high water, under natural conditions, may reach elevation 1,062.5 and I understand that this stage may, for a day or

less, be increased an additional foot by the action of the wind, to elevation 1,063.5. The effect of this stage upon the existing sewers, would be to increase the flow of ground water to some extent, but such increase should not be sufficient to require the installation of any additional equipment, and these conditions could only prevail for such limited periods that the cost of the additional pumping required would not appreciably affect the general result.

(b) With an ordinary maximum stage of 1,060, the pump would have to be operated about 82 per cent of the time under method A, requiring 1,221 kilowatt hours per annum and 58 per cent of the time under method B, requiring 864 kilowatt hours.

According to your report, high water under these conditions under method A, may be 2½ feet above the ordinary maximum stage or elevation 1,062.5, and I understand that under the most exceptional meteorological conditions, occurring perhaps once in 50 years, you estimate that this stage may even reach 1,064 with a possible additional rise of 1 foot, due to the action of the wind, or to elevation 1,065. At this elevation the water level would be only about 2 feet below the level of the street gutters in the business district and some of the streets in the eastern portion of the village, which are already occupied, would be flooded.

While the average cost of operating the existing sewers would not be materially affected under these conditions on account of the shortness of the time during which they would exist, it is apparent that the maximum elevation which should be permitted, under method A will be determined by conditions outside of the area which is served by the existing sewer system.

Under method B, and with an ordinary maximum level of 1,060, high water, once in 20 years, may reach elevation 1,061, extreme high water may reach elevation 1,062, and this may, for a day or less, be increased by the action of the wind to elevation 1,063, or a little below the extreme elevation under natural conditions. The effect of high water under method B, with an ordinary maximum level of 1,060, would therefore be similar to that under natural conditions and would not appreciably affect the cost of operating the existing sewers.

(c) With an ordinary maximum of 1,061, the lake level would approach the elevation of the lowest basements in the business district for about 50 per cent of the time and some increase in the flow of ground water would doubtless result. The pump under either method A or B would have to be operated about 85 per cent of the time and allowing an increase of 20 per cent for the increase in ground-water flow, which I consider a liberal estimate, the power consumed will average about 1,518 K. W. hours per annum.

The extreme high water under method A would reach elevation 1,066 and the extent of the area to the east of the business district, which would be flooded at this elevation, would be so great that I assume that this method need not be further considered.

Under method B, with an ordinary maximum stage of 1,061, the extreme high water, during storms, may reach elevation 1,064, which would only be 6 inches above the extreme high water under natural conditions. At this elevation, the outlet sewer would be submerged about one foot, but this would not appreciably interfere with the operation of the pump.

The principal effect, then, upon the existing sewers, of regulation under method B, with an ordinary maximum stage of 1,061, would be to increase the consumption of power from 372 kilowatt hours under natural conditions to about 1,518 kilowatt hours, a difference of 1,146 kilowatt hours per annum.

(d) With an ordinary maximum stage of 1,062, the lake would be about on the average level at which basements in the business district can be connected to the existing sewers and a further increase in ground water, as compared with an ordinary maximum stage of 1,061, would result.

Eliminating method A, the pumps under method B would have to be operated 92 per cent of the time and allowing another 20 per cent increase for ground-water flow, or a total increase of 40 per cent over present conditions, the consumption of current would amount to 1,918 kilowatt hours per annum, or 1,546 kilowatt hours more than under natural conditions.

A proper charge for current supplied under these conditions would be about \$.04 per kilowatt hour and the above figures show the increased cost of power, due to a regulation, will average from about \$20 to \$60 per annum. The attendance required will consist of a daily inspection and oiling during the pumping periods, but the cost to the village of such attendance and ordinary repairs



should not exceed \$150 per annum with the pump in continuous operation. The increased cost of attendance and maintenance, due to regulation, would, therefore, vary from \$50 to \$100 per annum, depending upon the method of regulation adopted.

My conclusions in regard to the effect of regulation upon the existing sewer system may be summarized by saying that the only effect of either of the methods of regulation considered will be to increase the cost of operation and maintenance from about \$70 per annum under (a) method B to about \$160 per annum for (d) method B.

It should be clearly understood, however, that the foregoing discussion and conclusion relates only to the existing sanitary sewers and does not relate to the effect of regulation of lake levels upon the removal of storm water, nor the effect upon those portions of the village outside of the business district which are now without sewers, which will be discussed under other headings.

#### GENERAL SYSTEM OF SANITARY SEWERS.

The existing sewers serve only the business district, and in order to provide proper facilities for the residence districts, a general system of sanitary sewers should be installed. On a copy of sheet 10 of the atlas, hereto attached, I have indicated in red the existing sewers, and in blue the location and grade of the new sanitary sewers which will be required in order to serve residences and other buildings which are now or may hereafter be built along the streets which have already been opened. Lateral sewers can be extended from the sewers indicated on the map whenever new streets are opened.

All basements of buildings connected with these sewers should be under-drained, as already indicated, in order to prevent seepage into the basements, and the house connections and the main sewers should be laid with tight joints so as to prevent the leakage of ground water into them, with a view to reducing the amount of pumping required to a minimum.

The elevation of the outlet sewer on the south side, where it reaches the river, will be 1,058, which is the same as the elevation of the present sewer on the north side where it enters the settling tank.

The cost of construction in this section would be substantially the same regardless of the method of regulation adopted, while the cost of operation and maintenance, under the various methods of regulation considered, would be substantially the same as that already outlined for the existing sewers and the conclusions applied to the existing sewers may also be applied to the sewers in this section.

The sewer west of the track would connect to the existing sewers at the intersection of Main and Lake Streets, and the construction of this sewer would result in an additional cost for maintenance and pumping at the present outlet. This additional cost would be somewhat less than that estimated for the existing sewers, but for present purposes I have assumed that it will be the same.

The new sewers on the north side, east of the track indicated on the map, aggregate about 2 miles in length. As some of these sewers would be placed at a depth of several feet below the ordinary natural lake level, any rise in the lake level, due to regulation, would tend to produce a slight increase in the seepage of ground water into the trenches during construction. This would result in slightly increasing the cost of installation, but in my judgment, this increase would not be material.

In order to give you some idea of how the cost of the operation of this portion of the system would be affected by regulation of the lake level, I will assume that the streets on which the 2 miles of new sewers are to be located are fully built up with a population of 800 per mile of sewer and with all buildings connected to the sewers. The average discharge of sewerage may be assumed at 60 gallons per capita per 24 hours, and the average amount of ground water to be taken care of, with the natural lake level or a regulated level with ordinary maximum at 1,060.0, may be taken at the same amount. For an ordinary maximum level of 1,061.0 I shall assume an increase of 20 per cent in ground water and for an ordinary maximum level of 1,062.0 an increase of 40 per cent.

The total population on the 2 miles of sewers would be 1,600 and the average amount of sewage would be about 100,000 gallons per day. The average amount of ground water, with natural lake level or a regulated level with ordinary maximum of 1,060.0, would also be about 100,000 gallons per day, which would be increased to about 120,000 gallons per day for an ordinary

maximum of 1,061.0 and to about 140,000 gallons per day for an ordinary maximum of 1,062.0.

The sewers at the outlets would be too low to discharge by gravity, even under natural conditions, and so pumping would have to be resorted to at all times. The receiving well should be about 8 feet deep, making the average elevation from which the sewage must be raised 1,048.0. With a natural lake level the discharge pipe should be at about elevation 1,060.0 and with a regulated lake level about 1 foot above the ordinary maximum level.

The average discharge of sewage and ground water combined and the average lift would then vary from 200,000 gallons per day and a lift of 12 feet, with a natural lake level, to 240,000 gallons per day and a lift of 15 feet, with a regulated level with ordinary maximum at 1,062.0.

A comparison of the cost of pumping is shown in the following table:

Lake level.	Discharge per day.	Lift.	Kilowatt hours per annum.	Cost of power per annum.
	<i>Gallons.</i>	<i>Feet.</i>		
Natural.....	200,000	12	8,288	\$331.52
Ordinary maximum 1,060.0 .....	200,000	13	8,979	359.16
Ordinary maximum 1,061.0 .....	220,000	14	10,636	425.44
Ordinary maximum 1,062.0 .....	240,000	15	12,432	497.28

As the pumps would have to be operated at all times regardless of the lake level, the cost of attendance and maintenance would be substantially the same with any of the methods of regulation considered, as under natural conditions.

In making a comparison of the costs of operation, I have had in mind, particularly, the ordinary conditions and have taken into consideration the conditions at the occasional extreme high water. As the extreme high water during storms, perhaps once in 50 years, under method A may be 5 feet above the ordinary maximum, it is apparent that a considerable portion of the area under consideration would be flooded during extreme high water with either of the ordinary maximum levels mentioned in your memorandum, and the adoption of method A would make this section of the village undesirable for residence purposes.

Under method B extreme high water during storms may be about .3 foot above the ordinary maximum level and with an ordinary maximum level of 1,060, the lower ground at the extremities of the sewer, indicated on the map, would be only about 1 foot above high water and any increase in the high water level would reduce the area which could be occupied for residence purposes.

From the foregoing it is apparent that the effect of the regulation of the lake level upon the area under consideration will depend largely upon the flooding of the surface rather than upon the cost of constructing and operating a system of sanitary sewers.

#### STORM WATER REMOVAL.

It would be very desirable to provide storm water sewers in the business district in order to provide for the rapid removal of storm water from the street gutters, this being especially important on account of the flat grades in this section. Outside of the business district the storm water may be removed by means of surface gutters and ditches, the water on the east side being drained generally to the north and east, following the natural slope of the ground.

A storm water sewer in the business district should commence at the intersection of Wabasha and McKenzie Streets with inlets at the four corners of this street intersection and should then run west on McKenzie Street to Main Street and thence south along Main Street to the river.

The sidewalks at the intersection of Wabasha and McKenzie Streets are at about elevation 1,067 and the grade of the storm water sewer at this point can not be higher than 1,064. This sewer should have a minimum fall of 2 feet from the intersection of Wabasha and McKenzie Streets to the outlet, making the elevation at the outlet 1,062. A branch to this sewer should be constructed on Lake Street, from Main Street to McKenzie Street, and, if desired, can be extended northerly along McKenzie Street to the middle of the block.



The lake level should not be above the outlet of this sewer in the winter time so as to avoid any obstruction from ice, but in the summer time the outlet could be submerged for short periods during extreme high water to elevation 1,064 without seriously interfering with its operation.

## CONCLUSIONS.

The following is a summary of my conclusions:

First. On account of the topography and character of the soil the construction of modern buildings with suitable basements will require the installation of an adequate system of sewers and the underdraining of basement floors.

Second. The separate system of sewerage should be adopted, sanitary sewers being provided on all streets and separate storm water sewers in the business district, the storm water in other districts being removed by means of open gutters and ditches.

Third. The existing sewers cover only the business district, including Main and Wabasha Streets between Lake and McKenzie Streets and Lake and McKenzie Streets between Main and Wabasha Streets.

Fourth. The cost of construction of the new sewers west of the railroad, both north and south of the river, will not be appreciably affected by either of the methods of regulating the lake levels considered.

Fifth. The cost of operation and maintenance of the existing sewers will be increased by regulation \$70,000 to \$150,000 per annum and the cost of operation and maintenance of the new sewers, indicated on the map, in each of the districts west of the railroad, would be increased the same amount.

Sixth. The cost of constructing the 2 miles of new sanitary sewers east of the railroad, indicated on the map, would not be materially increased by regulation.

Seventh. The cost of operating and maintaining these sewers will be increased from \$331, with natural lake level, to a maximum of \$497 with ordinary maximum at elevation 1,062.0.

Eighth. Finally, the determination of a desirable lake level, from the viewpoint of the village of Warroad, will depend largely upon the extent to which the surface may be flooded by extreme high water, rather than upon the cost of installing and operating a system of sewerage.

Respectfully submitted.

L. P. WOLFF,  
*Consulting Engineer.*

ST. PAUL, MINN., *January 1, 1916.*

Mr. TAWNEY. You have also the report of the State board of health?

Mr. MEYER. We have copies of the report made by the State board of health, on both the questions of the sewerage and the drainage, and also the report on the water supply.

Mr. TAWNEY. These reports will be embodied in the report.  
(The report reads as follows:)

## MINNESOTA STATE BOARD OF HEALTH

## DIVISION OF SANITATION

## REPORT ON SEWERAGE AND DRAINAGE AT WARROAD

DECEMBER 17, 1915.

The purpose of this investigation was to determine to what extent the maintenance of certain controlled levels in the Lake of the Woods would affect the operation of sewerage and drainage systems in the village of Warroad and the sanitation and public health of the community as compared with conditions which might be expected, should the water in the lake be allowed to assume its natural level. The investigation was confined strictly to the village of Warroad. All data regarding elevations have been obtained from the report of the consulting engineers to the International Joint Commission. For maps, frequency curves, etc., reference is made to this report.

The population of Warroad, according to the 1910 census, was 927. The village has been growing steadily and at present the population is considerably in excess of that figure. The inhabited portion of the village is located on

both the north and south banks of the Warroad River. Practically the entire settled portion of the village is above an elevation of 1,063. The highest natural elevation in the village is at 1,068. The topography is flat, the soil being a clay to a depth of over 20 feet in most places. On the data of this investigation, the reading of the Government gauge in the Warroad River was approximately 6.7, corresponding to an elevation of 1,060.3.

The business portion of the village is confined largely, though not wholly, to one block located on the north side of the Warroad River, between MacKenzie Avenue, Lake Street, Wabasha Street, and the C. N. R. R. A municipal sewer system of the sanitary type, constructed in 1914, provides sewers extending entirely around this block. The sewage collected by the system passes through a settling tank of the Imhoff type. The sewage is elevated by means of an automatically controlled water jet ejector and is discharged into the Warroad River beneath the Warroad Wharf. The elevation of the sewer outlet or discharge pipe is 1,062.5. The elevation of the sewer at the point where it enters the settling tank is approximately 1,058, according to the plans on file with this division. The highest point on the sewer system is at the intersection of MacKenzie Avenue and Wabasha Street, and is 1,061.6. The municipal sewer system at present removes the sewage from 12 stores and business houses.

In addition to the municipal sewer system, several of the residences and other buildings on both sides of the river are provided with private drains and sewers discharging into the river. The municipal water and light plant is provided with a private sewer with an outlet into the Warroad River beneath the Warroad Wharf. The public school, district No. 12, Roseau County, is provided with a system which discharges into the Warroad River west of State Street. The sewage from both the water and light plant and the school building is passed through septic tanks.

On plate 125, report of the consulting engineers to the International Joint Commission, for 1915, a curve is plotted, showing the relation between the actual controlled lake level and the computed natural level in per cent of total time for the period between 1893 and 1913. As indicated by this curve, the computed natural level in the Lake of the Woods averages nearly 3 feet lower than the actual controlled level observed during this period. According to the curve, the operation of a sewage lift or pump on the existing sewer system would be necessary about 25 per cent of the time were the lake at the computed natural level, whereas with the lake held at the actual controlled levels existing during this period, the operation of the lift would have been necessary approximately 85 per cent of the time.

On plate 139, report of the consulting engineers to the International Joint Commission, for 1915, are shown six curves, giving the per cent of time during the years from 1892 to 1914 during which the surface of Lake of the Woods would have been at certain computed elevations, had it been regulated according to one of the proposed methods of control defined as A and B on page 207 of the text, with ordinary maximums of 1,059, 1,060, and 1,061. The per cent of time during which pumping of sewage from the existing system would have been required during the period 1892 to 1914, had the lake level been maintained at any of these elevations, is given in the following table. For comparison, the table includes the per cent of time pumping of sewage from the existing system would have been necessary during the period 1893 to 1913 under computed natural lake levels and under the actual controlled levels, according to plate 125.

Regulation.	Ordinary maximum elevation.	Per cent of time pumping of sewage would have been required on existing system.
Method A.....	1,059	70
Method A.....	1,060	80
Method A.....	1,061	85
Method B.....	1,059	40
Method B.....	1,060	60
Method B.....	1,061	85
Computed natural, 1893-1913.....		25
Actual controlled, 1893-1913.....		85



It would appear, then, that the actual higher controlled levels in the Lake of the Woods, during the period from 1893 to 1913, and any of the proposed regulated levels as shown by the curves on plate 139, would influence the operation and maintenance of the existing municipal sewer system, only to the extent of making necessary the pumping of the sewage for longer periods of time than would be necessary were the lake allowed to assume its natural level during the same period. It should not be forgotten, however, that the present sewer system serves but a small portion of the village. A system at all comprehensive would probably require pumping of at least a part of the sewage a very considerable portion, if not all, of the time, regardless of whether or not the lake levels were regulated.

The present method of pumping the sewage is inefficient and expensive. At the time the sewer system was constructed, however, electric current was not available with which to operate a more efficient electrically driven sewage pump. Electric current is now available for this purpose.

As to the effect of the controlled high lake levels on the drainage of basements, especially where sewers are not accessible, it is evident that the lake levels do influence the ground water level to some extent, especially in the immediate vicinity of the Warroad River and near the shore of the Lake of the Woods. A high ground water level, of course, will result in damp and wet basements, where these are not provided with ample drainage. The ground water level is also greatly influenced by precipitation and, to some extent, by the upward pressure of the underground waters in the water-bearing strata underlying a surface clay. All deep wells examined, 100 feet in depth or over, were either flowing or the water rose to within a few inches of the surface, indicating a tendency on the part of the underground water to force its way upward through the overlying clay stratum. Water "seeks its level," and the underground waters are not exceptions. One of the factors in the flow of underground waters is the difference in elevation between the source and what may be called the outlet. In this instance the Lake of the Woods is probably receiving some of the ground water flow and may be considered as an outlet. If, therefore, the level of the lake were lowered the resisting head against the flow of the underground water would be reduced slightly, and the upward pressure of the underground water within the circle of influence of the lake would be lowered. The simplest method of determining the distance from the lake or the Warroad River, at which ground water level is affected by the lake levels, would be to dig test wells at various distances from the lake to a depth lower than the average lake level and to take gauge readings on the ground water level in these wells simultaneously with readings on the level of the lake water. These wells should be located where they would not be influenced by any existing sewer systems, and should be protected against the entrance of rain or surface water.

Damp or wet basements are not only an annoyance, but they tend to make the floors above cold and uncomfortable, and indirectly they may tend to reduce the vitality of persons who live in such buildings. So far as is known, there are no infectious diseases common to Minnesota conditions which are attributable directly to damp or wet basements. Under certain conditions, such places become the breeding places of mosquitoes or other insects. Also, the growth of molds is more luxuriant in damp places. Wet basements are not desirable places in which to store goods or merchandise. Three basements were inspected, the elevations of which are given in the report of the consulting engineers to the International Joint Commission, as follows:

Warroad Mercantile Co. store, located north of the Warroad River, south of Lake Street near its intersection with Wabasha Street. The basement of this building is at an elevation of 1,063.1. A private drain leads to the river. Water was standing under the wooden floor in a portion of the basement at an elevation of about 1,062.5.

Security State Bank Building, located on the northwest corner of Lake and Wabasha Streets. It is provided with a connection with the municipal sewer system. No water was standing in the basement, which is at an elevation of 1,061.5.

The State Bank Building, located north of Lake Street, between Wabasha Street and the C. N. R. R. The elevation of the basement is 1,063. There is no drain or sewer connected with this basement. Water was found standing in the basement to a depth of about 3 inches.

Two other basements, the exact elevations of which were not known, were inspected. These were in the Warroad Hotel and the public school, district No. 12. These basements were dry at the time of this inspection, although it was stated that previously water was standing in each.

It will be possible, by the construction of a comprehensive sewerage and drainage system and by waterproofing and draining of basements, to relieve the present situation to a considerable degree.

#### CONCLUSIONS AND RECOMMENDATIONS.

1. The maintenance of any of the proposed regulated levels of the Lake of the Woods will affect the operation of the existing municipal sewerage system by increasing the period of time that pumping of the sewage would be necessary and by increasing the height to which the sewage must be pumped, and possibly the volume. (See table on p. 3 of this report.) The existing system serves but a comparatively small portion of the village. Pumping of at least a portion of the sewage from a system which is at all extensive will be necessary a very considerable portion of the time, regardless of whether or not the lake level is regulated.

2. It is the opinion of this division that the high ground-water level, which is the cause of damp and wet basements, is influenced to some extent by the level of the water in the Lake of the Woods. The extent to which this ground-water level is influenced by the lake levels can be determined best by test wells, as outlined on page 6 of this report.

3. The effect of wet and damp basements on the health of persons occupying the buildings is indefinite. However, the fact can not be denied that wet and damp basements often make buildings uncomfortable, and their existence should be avoided if possible. Merchandise and goods stored in such places are often damaged. The present conditions can be much improved by the construction of adequate sewerage and drainage systems.

J. A. CHILDS,  
*Engineer.*

Approved:

H. A. WHITTAKER, *Director.*

DECEMBER 27, 1915.

THE REPORT ON THE WATER SUPPLY READS AS FOLLOWS: MINNESOTA STATE BOARD OF HEALTH, DIVISION OF SANITATION, REPORT ON THE PUBLIC AND THREE COMMUNITY WATER SUPPLIES AT WARROAD, DECEMBER 17, 1915.

The purpose of these investigations was to determine to what extent the maintenance of certain controlled levels in the Lake of the Woods would affect the operation of the municipal and private water supply and the public health of the community, as compared with the conditions which might be expected should the water in the lake be allowed to assume its natural level. The investigation was confined strictly to the village of Warroad.

#### PUBLIC WATER SUPPLY.

*Field data.*—The public water supply of Warroad is obtained from the Warroad River, approximately half a mile from the point where the river enters the Lake of the Woods. The intake through which the water is pumped extends a distance of about 3 feet into the river from the river side of the municipal wharf. The intake consists of a 10-inch corrugated culvert provided with a screen through which the water flows to an intake well located approximately 16 feet from the shore line. This intake well is about 16 feet in diameter by 14 feet in depth, and is constructed of brick masonry. It is provided with two 3-inch plank covers, placed approximately 3 feet apart vertically. From the intake well, the water is drawn through a 6-inch galvanized iron suction pipe 140 feet in length to the pumps located at the pumping station. The pumping apparatus consists of the following: One 5 inch by 8 inch duplex Platt Iron Works motor-driven pump, having a rated capacity of 100 gallons per minute; one auxiliary 1½ inch suction by 1½ inch discharge American motor-driven centrifugal pump, having a rated capacity of 70 gallons per minute; two new motor-driven No. 2½ American type duplex pumping unit centrifugal pumps, having a rated capacity of 250 gallons per minute. This pumping unit is arranged to operate either two stage or single.



The water is pumped into the distribution system and into a 40,000 gallon elevated steel tank located on a 90 foot steel tower. The distribution system consists of approximately 3,700 to 4,000 feet of water mains. The water is supplied to fourteen customers, including the Canadian Northern Railway. The present pumpage is approximately 120,000 gallons per twenty-four hours. Of this amount, the Canadian Northern Railway consumes approximately 80,000 gallons. About 30,000 gallons per day are needed to operate the municipal sewage lift.

The sanitary aspect of this supply is exceedingly poor. The Warroad River is known to be polluted. A sewer carrying the drainage from the pumping station and electric light plant, in which a water-closet is located, discharges into the river at a point approximately 20 feet above the water works intake. The outlet of the municipal sewer system is located about 200 feet above the intake, on the same side of the river. Further up stream, on the same side, is the outlet of the schoolhouse sewer. It is stated that water from the public supply is not used for drinking purposes. However, it is supplied to the lavatories in the public school buildings, district No. 12, Roseau County, and to the Warroad Hotel. Small children, not realizing the danger, may drink this water at the school, as may also guests at the Warroad Hotel.

Attempts have been made to secure a municipal water supply from an underground source. Two 6-inch wells have been drilled a short distance south of the pumping station. The first of these wells was constructed in 1913, and is stated to be 150 feet in depth. The formation encountered in drilling this well were clay, 23 feet, and the balance water-bearing quicksand. The second of these wells, located approximately 12 feet from the first, was constructed in 1914 and is stated to be 251 feet in depth. The formations encountered in drilling this well were as follows—clay, 23 feet; water-bearing quicksand, 137 feet; water-bearing fine white quartz sand, 40 feet; lignite coal, 12 feet; white quartz sand, 27 feet; blue clay, 12 feet, to the bottom of the well. The water in each of these wells rises to the surface of the ground. Trouble was experienced on account of the filling of the wells with quicksand. On account of the financial conditions of the village, no serious attempt has been made to develop the wells.

*Analytical data.*—See analytical sheet, samples 14,607 and 14,610.

*Interpretation of results.*—Samples 14,607 and 14,610, representing water collected on the distributing system show bacterial counts of 1,000 and 800, respectively, and *B. coli* was found present in 1 and 100 c. c. amounts. The high bacterial counts and the presence of *B. coli* in both samples indicates this water to be unsafe for public consumption.

The physical examination of sample 14,610 shows a water with a slight turbidity and relatively high color. The chemical examination indicates a water of moderate hardness, low in incrusting material.

*Conclusion and recommendations.*—The field investigation and analytical results indicate this water supply as obtained from the Warroad River to be unsafe for public consumption.

It is recommended that steps be taken immediately to develop the wells already constructed, and that all connections with the present source be abandoned.

#### MARTIN WIDSTEN WELL.

*Field data.*—This is a privately owned well, the water from which is used by persons living in the vicinity. The well is located south of the Warroad River on Washington Avenue, west of the Canadian Northern Railway. The well consists of a 2 inch casing driven to a depth of 110 feet. No information was available regarding the formations encountered in drilling the well. It is of the flowing type, the water being discharged through a 1 inch horizontal overflow pipe into a barrel sunk into the ground about 1 foot. The water flows from the barrel through a hole provided for the purpose, and escapes over the surface of the ground.

The sanitary aspect of the well itself was excellent. The water which might be collected from the receiving barrel is open to contamination by persons dipping pails into the water.

*Analytical results.*—See analytical sheet, sample 14,606.

*Interpretation of results.*—Sample 14,606, representing water collected direct from the well, shows a total absence of bacteria and *B. coli* was not found in 100 c. c. amounts.

*Conclusions and recommendations.*—Both the field investigation and the analytical results indicate this water as it was delivered from the well to have been of excellent sanitary quality.

It is recommended that the present receiving barrel be removed and that a ditch be dug or a drain laid so that the surplus overflow water from this well can be led away at such a depth that it will be possible to place a bucket under the overflow pipe in which to collect the water, thus eliminating the necessity of dipping into the barrel. (See figs. 9 and 10, pp. 24 and 25, bulletin entitled "Farm Water Supplies," attached.)

#### C. E. CARLQUIST WELL.

*Field data.*—This well is locally known as the "City Well," for the reason that a house has been constructed over it which is maintained and warmed at the expense of the village. The water from this well is used for drinking purposes by a large number of people located near the business center of the village. The well is located near the center of block 4, Moody's addition. The well consists of a 2-inch casing, drilled to a depth of 140 feet. The formations encountered in drilling the well were stated to be surface clay to a depth of 40 feet, below which are layers of blue clay and fine sand. The bottom of the well is in stone. A pit approximately 4 feet square by 6 feet in depth surrounds the well at the surface. This pit is curbed with timber and provided with a plank cover which forms the floor of the pump house. The water rises to approximately the surface of the ground. The well is equipped with a hand pump of the pitcher type.

The sanitary aspect of this supply could be improved. The waste water from the pump drains back into the pit around the well. There is apparently some loose connection in the casing, within the well pit, as the pump can be moved sidewise easily. The former drain connecting the well pit with the old city sewer is reported to have been disconnected.

*Analytical data.*—See analytical sheet sample 14609.

*Interpretation of results.*—The analysis of sample 14609, representing water collected direct from this well, shows a bacterial count of 130 per c. c. and *B. coli* was not found present in 100 c. c. amounts. The relatively high bacterial count for water from a well of this type would indicate the possible entrance of contaminated material through some leak in the well casing within the well pit. The physical examination of this sample shows a water with some turbidity and considerable color. The chemical analysis indicates a water of moderate hardness, in which there is no incrusting material. Iron is present to a considerable degree and is probably the cause of the color and turbidity which develop on standing.

It is to be noted that these formations do not coincide with those given for the two municipal wells at the village pumping station.

*Conclusions and recommendations.*—The field investigation indicates this water supply to be open to possible contamination, on account of the construction at the surface.

The analytical results indicate that only a slight amount of contamination was entering the well at the time of this investigation.

It is recommended that the floor of the pump house be removed; that the leaks, if any, be repaired; that the well pit be filled with sand; and that a concrete floor be laid in the pump house so that drainage will be conducted away from the vicinity of the well.

If any drains or sewers are found leading from the well pit, these should be filled with concrete.

(See figs. 6 and 7, pp. 21 and 22, bulletin entitled "Farm Water Supplies," attached.)

#### C. DUFALT WELL.

*Field data.*—This well is located at the rear of the residence of Mr. C. Dufault, which is located on lots 19 and 20, block 4, Lakeview addition. This well is used by a few families living in the vicinity and serves as a community supply. The well is stated to be of the bored type, 20 feet in depth. An 8-inch casing extends to a point approximately 5 inches above the surface of the ground. The well is equipped with a pump of the pitcher type, connected to a well tube which extends to a depth of approximately 18 feet. The well is protected at the surface by two wooden boxes built around the casing, which are filled with gravel.



The sanitary aspect of this supply was reasonably good at the time of this investigation.

*Analytical data.*—See analytical sheet, sample 14607.

*Interpretation of results.*—The bacteriological examination of sample 14607, representing water collected direct from this well, shows a count of 43 per c. c. and *B. coli* was not found present in 100 c. c. amounts.

*Conclusions and recommendations.*—The field investigation and analytical results indicate this water to have been of good sanitary quality on the date of this investigation.

It is recommended that the wooden box construction at the surface of the ground be replaced by more permanent concrete construction, as is shown in figure 5, page 20, of the bulletin entitled "Farm Water Supplies."

#### CONCLUSION.

1. The field investigation and analytical results indicate the water obtained from the Warroad River to be unsafe for public consumption. They also indicate that a safe water supply can be obtained from underground sources.

2. The maintenance of any of the proposed controlled or regulated levels in the Lake of the Woods, in the opinion of this division, will have no appreciable effect on the operation and maintenance of any of the public or private water supplies or on the sanitary quality of the water.

J. A. CHILDS,  
*Engineer.*

Approved:

H. A. WHITTAKER,  
*Director.*

DEC. 31, 1915.

Mr. MEYER. It was indicated yesterday that we had made some additional studies besides those that were presented in our report constituting the three volumes—text, plats, and tables. These studies were in progress for some time. They were not completed before the publication of the report, which bears the date of September 1, partly because of insufficient time and partly because of the fact that some of the fundamental data were not then at our disposal. One special study that was made was the effect of regulation of the levels of Rainy Lake on the level of the Lake of the Woods. As indicated by Mr. White yesterday more than half of the drainage area of the Lake of the Woods is tributary to Rainy Lake at its outlet, substantially at International Falls and Fort Frances, and more than 60 per cent of the run-off comes from that watershed. Yet it is true that the natural regulation on that watershed above Fort Frances and International Falls is so nearly complete that even with such regulation as can be exercised on those upper lakes it is not possible to secure as great an effect upon the levels of the Lake of the Woods as might be anticipated by those who would view these lakes by themselves. One study that we have made shows what the effect would be on the levels of the Lake of the Woods if the outlets had remained in their natural condition and the outflow from Rainy Lake had been regulated substantially as it has been during the past two years that is very nearly in accordance with our method B. Our study had to be limited to a specific manner of regulation so we assumed method B.

The results may be summarized by saying that the ordinary range of levels would be reduced, but that amounts to only about three or four tenths of a foot on an average in the reduction in ordinary high water, and by that I mean a stage, speaking in general terms, that would prevail anywhere from 15 to 20 or 25 per cent of the time, so as not to bring into the discussion now the question of ordinary high water and the ordinary low water, say, that prevails 20 or 25 per cent

of the time, considering the entire year, would be raised only about three or four tenths of a foot. At certain times the increase would have amounted to possibly a foot. The reduction in high water at times amounted to a little more than three or four tenths of a foot, but the sum total of the regulation of the levels of the outflow from Rainy Lake on the basis of about 100,000,000,000 cubic feet of available storage capacity is that the ordinary high levels were reduced about three or five tenths of a foot, and the ordinary low levels increased about an equal amount.

Mr. HILTON. You have reference to the Lake of the Woods?

Mr. MEYER. Yes. The extreme low level would not be materially changed, but the extreme high level of Lake of the Woods would be somewhat increased, due to the fact that under method B on Rainy the natural inflow is discharged as rapidly as it comes into the lake. Under natural conditions the rate of inflow into any lake at the time of maximum outflow may be less, but before the time of maximum outflow is reached the maximum inflow may be more than twice as great as the maximum outflow in a state of nature. If the lake is held at a higher level than the natural one it is possible, depending upon the method of regulation adopted, for the lake to be substantially full at the beginning of a period of high run-off. Then, if the lake is not to be allowed to rise above that predetermined level, it is necessary to discharge the water as rapidly as it runs in, and as I said before, the rate of inflow may be twice as large as the rate of outflow in a state of nature. That is one reason why we advocate a certain reserve storage capacity that can be utilized at these times of extreme high water, so that when the rate of inflow becomes large, instead of sending the water out as fast as it comes in, let a certain portion of that inflow be stored, just as nature would do, and discharge the remainder. Now, it is possible to limit the discharge below the maximum that would have occurred in a state of nature, but as I said a minute ago, this study of Rainy Lake was made on the basis of method B, which assumes that when the lake is full the water would be discharged as rapidly as it comes in.

In connection with the studies on Rainy Lake, on page 210 we say:

Granting now that regulation according to method B would permit of the most advantageous use of the waters of Rainy Lake—and we believe no successful combination of these two methods can be applied—it follows, as previously pointed out, that 100 billion cubic feet is about the maximum total storage capacity which need be provided in order to equalize the outflow from Rainy Lake to the greatest practicable extent.

That, taken by itself, may readily be misinterpreted. At another point in the report—I do not recall the exact page—we state that efforts to save water at a time when it is not needed will result in raising the lake to a higher level than the one previously determined upon. Any effort to combine the two methods, without making definite provision for such increase, really represents the gist of what we mean in connection with this combination of methods on Rainy Lake. Either you decide that you will discharge a certain minimum and provide for the necessary reserve storage capacity, or you will provide to discharge at some other rate which will attempt to utilize the greatest amount of available water. But it is not feasible to attempt to equalize the flow each year to a variable extent, assuming that you know what the inflow is going to be. To illustrate that, by the use of the



mass curve, a combination of those two methods would virtually be the drawing of lines representing rates of flow lying between the line represented by method B and that represented by method A, and not definitely fixing that line. We do not mean to say that it is not feasible, that it will not be desirable and most advantageous to combine certain methods of regulation at Rainy Lake with some other method of regulation on the Lake of the Woods, and, as indicated by Mr. White, that that matter had been under discussion for some time and was discussed somewhat at the Detroit meeting last January, and we have made some studies as to what it would be possible to do under those conditions. We have assumed that the outflow from Rainy Lake would be regulated in accordance with method B, and that the outflow from the Lake of the Woods would be regulated in accordance with method A. That would mean that at the beginning of the extreme dry spell in 1910 the Lake of the Woods would have been full up to its ordinary maximum level, whatever that might be, this study being entirely independent of any specific levels.

These methods apply to an ordinary maximum of 1,058, 1,059, 1,060, 1,061, 1,062, or any other level. They are entirely independent of any ordinary maximum or extreme high level. They are all relative. The result would be under that combination of methods of regulation—that is, B on Rainy Lake and A on Lake of the Woods—that with five feet of maximum draft occurring once in 21 years it would have been possible to discharge 9,260 cubic feet per second over the entire dry period extending from 1910 to 1913. Higher rates of draft on storage, or a higher total draft on storage, would have resulted in higher rates of discharge.

It appears to be desirable to discuss, further, the levels that would prevail under various methods of regulation. When we speak of 5 feet maximum draft we do not mean that the ordinary fluctuation would be 5 feet. We mean exactly what we say—5 feet of maximum draft occurring only at the time of low water. During the other years the variation in level might not be more than a foot or 2 feet or  $2\frac{1}{2}$  or 3 feet, as indicated by the frequency curves. The levels that would have prevailed on the Lake of the Woods, in case the outlets had remained in their natural condition—that is, the levels that would have prevailed according to our computations—and those which actually did prevail, are shown on plate 125. The levels which would prevail under various methods of regulation are shown on plate 139.

It appears from the lower portion of that plate 139 that if the lake were regulated according to method B, with a maximum draft of 5 feet on storage, that the variation in level for 90 per cent of the time would have been  $3\frac{1}{2}$  feet, and for 80 per cent of the time about 2.8 feet. On the upper portion of that plate we show the levels that would have prevailed if both lakes had been regulated in accordance with method A. While we do not show the levels that would prevail under a combination of methods B on Rainy Lake and A on Lake of the Woods, that combination will result in levels that are very similar to those prevailing under the condition of A on both lakes. So that the upper curve may be considered as being also approximately correct for that condition of regulation. Those curves show that for 70 per cent of the time under method A the fluctuation would have been only  $1\frac{1}{2}$  feet, because during a portion

of the time it would have been necessary to draw upon this reserve storage, and that would have created an additional fluctuation on the other side of the ordinary maximum.

In the case of the combination of method B on Rainy Lake and method A on Lake of the Woods, the Lake of the Woods would be substantially at its ordinary maximum level, and by that I mean, say, within  $\frac{1}{2}$  foot of it, for about 90 per cent of the months of June, July, August, and September. In connection with the question of prevailing levels, and in reply to a question that was put to me this morning, I would say that on page 169 our frequency curves of prevailing levels show that, considering the months of June, July, August, and September, the computed natural level would have been above 1,056.0 for about 80 per cent of the time, and it would have been below 1,059.2 for 80 per cent of the time, and above 1,059.2 for 20 per cent of the time.

Mr. BERKMAN. Just one question; did you say it would be below 1,059 80 per cent of the time?

Mr. MEYER. Below 1,059.2 80 per cent of the time and above 1,056 for 80 per cent of the time.

Mr. ROCKWOOD. May I ask a question—probably you have stated it—as to whether that means in a state of nature—that is, if there had never been any regulating works put in at the mouth of the lake?

Mr. MEYER. Yes.

Mr. BERKMAN. During the months of June, July, August, and September?

Mr. MEYER. Yes; and covers the period from 1893 to 1913, inclusive. It would be a little different over a longer period.

Mr. ROCKWOOD. With reference to the question yesterday, when you said you concluded 1,059 was the ordinary high-water mark, does that also mean in a state of nature, and if there had never been any works constructed—

Mr. MEYER. We refer to that question of the ordinary high-water mark in our report on page 168, and we indicate there that in view of the fact that the levels which have prevailed on the lake during the past 20 years are substantially higher than those which would have prevailed under natural conditions, the character of the vegetation around the Lake of the Woods does not offer a satisfactory evidence of prevailing stages, and that, therefore, we consider it desirable to point out some other measure, one measure at least, of what might be considered ordinary high water, and we there indicate that it may be urged that a level which prevails 20 to 25 per cent of the time during the agricultural season, considering therein the months of June, July, August, and September, may be considered as representing an ordinary recurrent phenomenon.

Mr. ANDERSON. In other words, that a level exceeding 1,059 might be ordinary high water?

Mr. MEYER. What is that question?

Mr. ANDERSON. That a point exceeding 1,059 might be ordinary high-water mark?

Mr. MEYER. Someone might argue that it is so.

Mr. ANDERSON. That is as far as you go?

Mr. MEYER. We say this would appear to offer one criterion. We express our own views. That, of course, does not necessarily limit



anyone else's views as to what may be considered ordinary high water, either above or below.

Mr. ANDERSON. You do not in the text indicate your view of what is ordinary high water. I am referring to page 169?

Mr. MEYER. We say at the top of that page:

Ordinary high water, from the viewpoint of the riparian owner, however, depends upon the stages which prevailed during the planting, growing, and harvesting seasons, rather than those which prevailed through the year considered as a whole.

And then we take out the levels that prevailed during the agricultural season, as against the levels which prevailed throughout the year as a whole.

Mr. ANDERSON. You do not on page 169 express an opinion as to what ordinary high-water mark is.

Mr. MEYER. We come as close to it as might be possible or feasible for us to do, in so far as we were making a report on physical facts, so far as we were able to determine them, to our commission.

Mr. ANDERSON. You put it at 1,059 or above?

Mr. MEYER. I do not think we say so in our report, and I do not say so now.

Mr. ANDERSON. You say 1,059 or above. That does not mean that you say that is ordinary high water.

Mr. ROCKWOOD. I do not like to press it at all, but either I did not make myself plain, or I fail to understand you. Now, yesterday, as I remember, you expressed the opinion that ordinary high water, in the legal sense, on the Lake of the Woods is 1,059. Now, is that with reference to a state of nature and without any artificial works at the mouth of the lake?

Mr. MEYER. Any expression that either Mr. White or I have made in that regard refers to a condition of nature, and not to a condition of control. Our statement in the report, on page 228, reads:

Near the close of our discussion, "On prevailing levels on Lake of the Woods in a state of nature," we indicated that a stage of 1,059 appears to be fairly representative of ordinary high-water stages under natural conditions.

Whether that is the legal, technical high-water mark, we would leave it for the legal profession to determine and not the engineers. We refer to the Minnetonka decision, in so far as it has bearing on the physical evidences determining ordinary high-water mark, and then say that the prevailing higher stages on the Lake of the Woods make it impracticable to judge of ordinary high water in a state of nature on the basis of those physical evidences, and therefore we believe recourse must be had to some other method of determining high water from the physical viewpoint.

Mr. WYVELL. Now that we are on this point, there is one question I want to ask: Under method A on both the Lake of the Woods and Rainy Lake, what do you calculate will be the extreme range—that will be the extreme range between your extreme low and your extreme high?

Mr. MEYER. Under method of regulation A on both Rainy Lake and the Lake of the Woods, the extreme fluctuation, considering now the 5-foot maximum draft on storage, and also the amount of reserve storage capacity required to take care of the exceptional conditions that recur once in a large number of years, the total range

between extreme low water and extreme high water during the last 21 years, according to our computations, would have been 7.3 feet.

Mr. MIGNAULT. Under a state of nature?

Mr. MEYER. No, under a condition of regulation of A on Rainy and A on Lake of the Woods, and with a hundred billions cubic feet of storage capacity on the upper Rainy watershed. Considering the longer term of years, that extreme range would be naturally increased somewhat, no one could say exactly how much. If the conditions that produced the extreme high-water mark on the Lake of the Woods, 1,062.5, and approximately 500 on Rainy Lake, and the extreme high water mark on all the boundary waters, should recur, it is probable that the required amount of reserve storage capacity, instead of being 2.3 feet, as indicated for the past 21 years, may be substantially over 3 feet.

Mr. WYVELL. Your answer during the 21 years would be——

Mr. MEYER. Seven and three-tenths feet.

Mr. WYVELL. Under method B on Rainy Lake and B on Lake of the Woods, what do you calculate would be the extreme range—that is, between your extreme low and extreme high?

Mr. MEYER. The extreme range in levels under method B on both Rainy Lake and on Lake of the Woods, according to our computation, would be 5.9 feet. In both of those studies, we have assumed an outflow capacity of 40,000 cubic feet per second at the ordinary maximum level on the Lake of the Woods. And the Lake of the Woods Reservoir, regulated according to modified method B, which provides for 9 feet reserve storage capacity, and perhaps I ought to insert a statement here to indicate that the previous reply also assumes regulation according to modified method B, rather than to the fundamental B, which assumes no reserve storage, the difference between the two methods being merely that in the case of modified method B, we assume that a certain amount of reserve storage capacity is provided, which can be used for the storing of the excessive run-off in the exceptional year, instead of discharging it as rapidly as it runs into the lake, which may be, under methods A, as high as, I believe, 75,000 cubic feet per second, and, according to method B, I believe, about 56,000 cubic feet per second, as against the 40,000 cubic feet per second discharge, under the ordinary maximum stage assumed for modified method B.

Mr. WYVELL. Now, to clear up one other point as we go along. Referring to page 169 of the text of your report, have you a similar table showing conditions with reference to actual levels from 1893 to 1913, inclusive?

Mr. MEYER. That is the actual controlled level during the summer season. We do not have it in shape for presentation. The figures are there and can be compiled.

Mr. WYVELL. Will you be good enough to supply for the record a statement of what the high level was 80 per cent of the time under conditions of control over the past 21 years and what the low stage of the water was 80 per cent of the time?

Mr. MEYER. During the months of June, July, August, and September?

Mr. WYVELL. And also during the entire year.



Mr. MEYER. I can reply to that question at the present time so far as the actual levels prevailing during the entire year are concerned. For 80 per cent of the time the actual level that prevailed during the past 21 years would have been above 1,058.3, and for 80 per cent of the time it would have been below 1,060.9.

Mr. WYVELL. Now, could you at a later time give the same figures for the months of June, July, August, and September?

Mr. MEYER. I can, and will be glad to do so.

(Mr. Meyer later supplied the following data:)

For 80 per cent of the time the levels which actually prevailed on the Lake of the Woods during the months of June, July, August, and September between 1892 and 1914 were above 1,059.5 and for 80 per cent of the time below 1,061.2.

Mr. BERKMAN. Mr. Meyer, before we leave this, take plate 139 with method A on the upper Rainy Reservoir and method A on the Lake of the Woods. For instance, take the computed regulated level with the ordinary maximum of 1,059. On this plate it indicates that about 60 per cent of the time the lake would be below 1,058.5. Am I right?

Mr. MEYER. Do you mean above or below?

Mr. BERKMAN. Below. I guess it is 65 per cent of the time.

Mr. MEYER. Are you taking 65 per cent?

Mr. BERKMAN. I guess it is 65.

Mr. MEYER. It would have been above 1,058 for 60 per cent of the time and below 1,058 for 40 per cent of the time.

Mr. BERKMAN. Now, this 40 per cent of the time that it would have been below, could not the lake have been regulated so as to keep the water from going below 1,058?

Mr. MEYER. By closing off the outlets completely or nearly so. The inflow from Rainy Lake would have supplied the necessary water for evaporation from the lake surface, and in that way have held the lake at that level if the outlets were shut off.

Mr. BERKMAN. If you were considering the interests of navigation, then, you could regulate it so it would not need to go below 1,058.5?

Mr. MEYER. Yes; you could close the outlets so it would not go below that, assuming, now, that the inflow from Rainy was sufficient to supply the evaporation, which would probably be true, although in the extreme dry years that is not quite the case. Our mass curves show that in 1910 there was an actual loss from the Lake of the Woods instead of an addition.

Mr. BERKMAN. I understand that. By reason of keeping it down the other portion of the time you would not have any reserve, so in case there is not as much water running in as there is evaporation it would reduce it below that point.

Mr. MEYER. Yes.

Mr. BERKMAN. But in the interest of navigation it could be kept up at any of these other computed regulated levels in the case of 1,060 and 1,061?

Mr. MEYER. Substantially so.

Mr. BERKMAN. And the range would not in such case need to be more than about two feet, except for about five per cent of the time?

Mr. MEYER. Except for that extreme rise.

Mr. BERKMAN. Except for that extreme rise, for what per cent of the time could it be kept within a minimum range?

Mr. MEYER. Except for wind conditions it might be kept within a range of one foot for possibly 50 or 55 per cent of the time, and for the remaining 10 per cent, making it say 65, it would have to rise above that in order to take care of the excessive inflow.

Mr. BERKMAN. Well, it would not need in any case to rise above the computed ordinary maximum more than about 10 per cent of the time?

Mr. MEYER. That is correct. In discussing the question of prevailing levels it is desirable to consider more than the period of 21 years for which we have reasonably complete records. We have some records of precipitation at Duluth, Port Arthur, Winnipeg, and Pembina, which stations, while somewhat removed from the watershed, do afford some indication of the precipitation during the earlier years. We have made a study of the probable precipitation on that watershed from 1872 to date. The graph of the precipitation which I hold in my hand shows the average precipitation over the entire watershed smoothed out by averaging three years, giving the central year the weight of two. That is a progressive mean precipitation. It removes slight irregularities due to the annual variations and spreads the effect over three years so as to show more nearly the general trend. That curve shows a very marked period of low water beginning in the early eighties and extending up to about 1889. It shows immediately preceding that extreme dry spell a period of high-water years, higher than any that we have had since 1893. So that covering the period of years from 1872 to date the indications are that still lower levels would have prevailed on the Lake of the Woods than prevailed during the last 21 years and also still higher levels. The run-off from the tributary watershed would have varied to an even greater extent than the precipitation, as is also well indicated by the curve, the run-off during the last period of years showing a distinct dropping off. There is every reason to believe that there will be an increase at some time in the future. The year 1915 gave a run-off slightly above the average. The snowfall this winter has been considerably above the average. There is every reason to believe that we are at the beginning of a period of years when there will be a greater run-off than there has been during the past 10 years, possibly resuming the high portion of the cycle.

Mr. BERKMAN. In calculating the percentage of the time, taking the four months on page 169 of your text, you have not figured in the last two years; that is, 1914 and 1915. You have arrived at a figure of from 20 to 25 per cent that it would have been above 1,059.

Mr. MEYER. Yes.

Mr. BERKMAN. Now, what difference would those last two years make?

Mr. MEYER. They would result in changing the curve slightly. That is, the stage of 1,059 would prevail for a slightly smaller proportion of the time. I could not tell you off-hand just what per cent that would be. It would make a relatively small difference.

Mr. BERKMAN. It would be the relation between 21 years and adding the two years to it?

Mr. MEYER. Not necessarily equal to one-tenth. It might at that point on the curve make more or less difference, dependent upon the



length of the time during those years that that stage prevailed. That is, it depends on the shape of this curve of annual levels.

Mr. BERKMAN. On the Lake of the Woods in the year 1915 the computed natural level would not have gone very much above 1,057?

Mr. MEYER. I think that is correct.

Mr. BERKMAN. Just probably one or two tenths above 1,057, and during the year 1914 it did not exceed 1,057?

Mr. MEYER. That is correct. It had just reached 1,057 in 1915.

Mr. BERKMAN. And it did not exceed that in 1914. Am I right in that statement?

Mr. MEYER. That is correct. Now, I have called attention to that variation in precipitation so that we could have it in mind in considering the possibility of less water being available than shown by our studies covering the past 21 years, and also the possibility of more reserve or excess storage capacity being required than indicated by those studies covering 21 years.

(The commission thereupon, at 12.45 o'clock p. m., took a recess until 2.30 o'clock p. m.)

#### AFTER RECESS.

The commission reconvened at the expiration of the recess.

Mr. MAGRATH. You may proceed now, Mr. Meyer.

Mr. MEYER. Mr. Chairman, just before the close of the forenoon meeting I was speaking of rainfall and run-off over a long period of years. I stated that the run-off during 1915 had been somewhat above the average, that the snowfall during the winter was above the average, and that we could not expect a higher run-off next year and probably for several years to come than the average. I would like to correct that statement slightly in that the run-off as I had it in mind during 1915 did not include the entire twelve months of the year. I was informed afterward by one of my assistants that the records show that taking it up to January 1 the average for the year is still slightly below the normal.

Mr. GLENN. Upon what do you base your idea, Mr. Meyer, in regard to the run-off being any more in 1916, 1917, and 1918 than it has been in years past?

Mr. MEYER. In a general way on the recurrence of phenomena in cycles. We have had the low spell and we are due to have a higher rainfall and higher run-off. The rainfall during the present winter season has been above the average. In that connection, I would like to impress upon you the further necessity of having in mind the larger possible variations in run-off than those covered by these specific studies, covering 21 years, and when we refer to a maximum draft of 5 feet occurring within this period of 21 years it does not follow that if the draft on storage was absolutely limited to 5 feet it would be possible under method A, for example, to maintain the flow here indicated, indefinitely into the future. It would appear from that consideration, if from no other, that the extreme lower limit should be flexible, just as the extreme upper limit should be flexible, in order properly to take care of the extreme variations in natural phenomena which may occur and which no one can predict, at least no one can predict with absolute accuracy.

I might say at this point that those of you who are interested in prevailing levels under various methods of regulation can take levels directly off the mass curve by scaling the distance between the mass curve of inflow and the straight lines indicating the regulated outflow, and comparing these values in billion cubic feet with the capacity of 1 foot in depth on the lake. That is, 1 foot of storage on the lake represents substantially 41.4 billion cubic feet. So that lake levels at any season of the year can be scaled off directly from the mass curve.

I referred this morning to regulation of the outflow from Rainy Lake and said that during the past 21 years or so it had been substantially in accordance with method B. I am referring there, of course, to the outflow as it is being controlled by the dam at the outlet of the lake. That outflow has varied from what we call regulation under method B to the extent that the discharge has not been as great as we assume under method B for all of the months covering the past few years. For example, during October and November of the year 1915, the discharge was about 7,000 cubic feet per second, and during December it was about 9,000 cubic feet per second.

The lake, then, at the present time is at a higher stage than it would be if the outflow had been 10,000 cubic feet per second, and, naturally, in order to prevent the lake from rising above a predetermined level under regulation by method B it would be necessary to draw off sufficient water before the spring run-off in order to provide for the necessary storage capacity, which virtually means drawing off the water that has not been drawn off during the previous months, presumably because it could not be advantageously utilized.

I would like to take up next the discussion of some matters relating to the water powers at the outlets and the water powers on the Winnipeg River below. We hope that the power interests will furnish us with considerable additional information needed by the commission in order to reach some conclusion with respect to the most advantageous use of the waters flowing from the Lake of the Woods and the methods of regulation that may result in the most advantageous use of those waters for the various purposes indicated in the reference.

Perhaps at this point I might say that personally I believe that while we present here certain definite methods of regulation so that we may be able to judge as to some of the physical limitations of various methods of regulation, after all, continuous and intelligent supervision, based upon the physical data, the natural phenomena, the hydrographic data over the watershed, and the needs of the various industries will be far better than any definite plan of regulation which can be formulated. And yet, at the same time, I believe it is desirable to make definite studies of methods of regulation, and compare the results in order to see if there are possibly certain limitations, just as we have already indicated that under certain methods of regulation an additional amount of reserve storage capacity will be required. Under that same method of regulation it may be necessary to provide additional outflow capacity.

Referring to method A, the inflow may be taken care of by providing increased outflow capacity or additional reserve or excess storage capacity. As an approximate figure we might have in mind that half a foot of reserve storage capacity is approximately equivalent



to four or five thousand cubic feet per second of additional outflow capacity. Then, assuming that we have 40,000 cubic feet per second as the outflow capacity available under a certain condition of regulation, and 2 feet of reserve storage capacity under this given method of regulation, and if we desire to reduce that reserve storage capacity to 1 foot it would be necessary to increase the outflow capacity by approximately 8,000 or 10,000 cubic feet per second. Reducing the reserve storage capacity would, of course, limit the extreme high water mark and would benefit both the agricultural interests and the campers on the lake. Increasing the discharge will be a detriment to the campers below. Increasing the discharge will also be a detriment to the water powers at the outlet and to the water powers down the river, in that it raises the tail-water at those places. It is a case of balancing advantages and disadvantages.

Among other things that we would like to know from the power interests is the elevation at which the tail-water would stand for various rates of discharge at the various developed and undeveloped sites on the river, in order to see what the effect would be. We know what the effect would be at the outlets because we have the necessary physical data. In a state of nature the head at the outlets was practically uniform, varying between very narrow limits. As indicated on plate 138, in a state of nature the head at the outlets would have varied from 15.8 feet to about 18 feet. Under our method of regulation B the head would have varied from 10 feet to 22 feet for an ordinary maximum level of 1,060. Under method of regulation A the head would have varied from about 6 feet to 22.3 or 22.4 feet. The inter-relationship between method of regulation and available power depends upon two factors—the discharge and the head. No doubt there is a similar effect at the various water power plants below.

The method of regulation and the discharge from the lake has a very intimate effect upon any power development on the western outlet. The amount of fall required between the lake and the dam varies with the stage and with the amount of water to be drawn through the western outlet. The greater the discharge capacity to be provided with a given method of regulation the greater the excavation, and the greater, naturally, the cost of providing this additional channel capacity. That is, the greater the discharge the less the head for a given channel capacity.

Another matter to be considered is the extent to which the outflow is at present utilized and will be utilized at the various sites in the future. In the past the powers at the outlet have used only a portion of the available water supply. It was to their advantage then to discharge no more than they could utilize except when it was necessary to waste the water to keep the lake level from rising above a certain point, but assuming that there had been demand for more of the water, it would have been necessary and desirable to discharge the water, and in that way the lake level would have fluctuated to a greater extent. The outflow might on the whole have fluctuated through a lesser range. It would appear on the face of it that if only a portion of the water is being utilized, it is possible to save the water so that you will have it when the dry spell comes along. That is substantially method A. If you want to utilize the maximum amount

of run-off that can possibly be utilized within the limits of advantageous utilization, method B appears the more desirable.

As we proceed down river we come to the two developed water powers and a number of water-power sites making up an aggregate utilizable fall of 290 feet as reported by the Dominion water-power branch, or, I believe, more accurately, 291 feet.

Another matter that may be taken into consideration here is whether or not the plants utilizing the water of the river are utilizing it at a uniform rate throughout the day and at a uniform rate throughout the year or approximately so, and whether or not, if that is not the case, sufficient storage capacity exists between the several plants so that they may be independent of each other, or whether or not certain sites on this river are entirely dependent upon the discharge from the plant at the site immediately above. For example, if one plant is located immediately above another and there is no possibility in the way of available pondage or storage between the sites, to equalize the flow then that lower plant must use the water just as it is being discharged from the upper plant. If that upper plant is discharging it very rapidly during a portion of the day and possibly half as fast or less than that during another portion of the day, that plant below must use the water in accordance with the discharge as it comes to it. So these plants may not be entirely independent of each other. Some of them are. For example, there are about 85 square miles of water surface between the outlets and the first undeveloped site down the river. That permits a complete equalization of flow between the two plants, and any plant put in at White Dog Rapids could operate independently so far as daily variations in discharge at the outlet are concerned. If manufacturing plants are placed at the outlets the plant at White Dog Rapids need not use the water as it is being discharged at the outlets.

If, at all of the sites, the water is to be used uniformly throughout the day and throughout the year, there would appear to be no choice between methods B and A, method A being clearly the more desirable of the two. If the plants down the river, however, have a load factor of less than 100 per cent—that is, have a varying demand for power during the day—that conclusion may not be entirely correct. We are desirous of knowing what the load factor at the installed plants is and at those whose construction is at present contemplated. We would like to know how the demand varies during the year, in addition to the variation during the day. Suppose that the peak load which is represented by these two graphs indicating approximately the load on the two plants now in operation, extends for only four hours of the day, and support it extends over only a week, or two or three or four weeks out of the year. To install a water-power plant of sufficient capacity so as to carry that peak and not operate it at all for the remainder of the time will make that power cost possibly 4 or 5 cents per kilowatt hour. The cost of operating a steam plant here will probably be about 0.65 or 0.70 of a cent per kilowatt hour. It may run a little above that, dependent very largely on the price of coal and the size of the units that are being considered.

Another matter should receive consideration, and that is whether it is necessary for the particular markets to which this power is supplied to insure that there shall be no interruption in service. If



so, how shall that insurance against interruptions in service be accomplished? Can it be accomplished by interlocking the several plants? Can it be accomplished by a steam plant in the city of Winnipeg? There is at the present time a steam plant in existence which, I believe, has a capacity of 22,000 horsepower. Our records are a little incomplete on that score, but we will have that information at these hearings. The question is whether a certain amount of steam reserve must be provided for other purposes, and, if so, whether then it is not cheaper to operate the steam plant a certain portion of the time and thus reduce the installation at the water power plants so far as the carrying of a given peak is concerned. And, further, whether it does not pay to insure against a low flow by this steam reserve instead of developing merely the minimum flow of the stream which, according to our computations, would have prevailed during the past 21 years, but which we can give no assurance will prevail over a period of possibly 25 or 50 years. Even within the next 10 years we may have a low supply which will completely throw out our computations, and then the question is when this low flow can not be maintained on the draft indicated what are you going to do? Are you going to increase the draft? Are you going to develop a new power site? Are you going to operate the steam reserve in order to supply the deficiency? If you have a steam reserve in order to supply the deficiency the next question is, approximately what are the requirements as to the size of the steam reserve? Much will depend upon the load factors.

If you have pondage above your water power plants and you have a daily load factor of about 60 per cent, say, a steam reserve of half the size represented by the deficiency in flow would be sufficient to furnish the power, because you have your additional power installation that will carry a peak and the steam plant would be operated continuously to take the low heavy portion of the load represented by your load curve. This may be illustrated by this rough diagram, for example, which shows a typical load curve based upon the data at our disposal, with a load factor of between 60 and 65 per cent. The capacity of steam plant required in that instance is just half of what would be represented by the deficiency in flow. If the load factor is 100 per cent, the steam plant would have to be equal to what is represented by the deficiency in flow reduced to terms of power.

I am just trying to indicate some of the considerations and the information that we as engineers, and I am sure the commission, desire in order to be able to give proper consideration to all of the various interests involved.

There is just one other matter to which I would like to call attention, and which the power interests may have considered. They may have a definite proposal to make. That is, is it feasible and desirable to regulate the outflow from the Lake of the Woods in connection with the flow of the English River? I mean by that, is it feasible, economical and desirable to use the flow of the English River when it is available, holding back the water in the Lake of the Woods at that time and discharging more water from the Lake of the Woods when the flow of the English River is less. The low water flow of the English River is about half the low water flow

from the Lake of the Woods in a state of nature. The average flow from the two watersheds appears to be substantially the same. High water flow from the English River appears to be substantially higher than the high water flow from the Lake of the Woods, as might be expected on account of the natural regulation on the Lake of the Woods watershed.

Mr. White has just indicated that it would be desirable at this point to call attention to some of the quantities involved in the matter of enlargement to provide certain outflow capacity so that we may have at least some approximate figures in mind in dealing with this matter. We have made some studies of the excavation required in order to provide merely outflow capacity in the western outlet and also the excavation required for the purpose of utilizing the western outlet or the Norman Dam for power development. The excavation required in operating the western outlet for regulation purposes only is approximately 40,000 cubic yards. This assumes that the regulating works would be opened just as wide as possible, practically destroying the head at the time of high discharge. Assuming excavation to the extent of about 110,000 or 115,000 cubic yards, in order to provide for power development—and that, by the way, represents rock excavation, which I presume will run \$4 or \$5 a yard, dependent upon the methods that can be pursued in making the excavation, whether in the dry or under water or in deep water—there would still be a fall of three feet to four feet required between the lake and the site of the dam, varying with the lake stage and the discharge.

We also considered the possibility of discharging the water at other points besides through the western outlet and had insufficient information on which to base an accurate computation, but from the meager data available it did not appear that the excavation could be made at even the same expense that it could be made in the western outlet. More detailed surveys, however, may alter that conclusion.

At this point I would like to refer back once more to a matter that I am sorry I did not take up a while ago in connection with the probable low water that may occur during a long period of years.

I was speaking of the high water and failed to take up the probable low water, as represented by the precipitation records and other data at our disposal.

It was indicated in a statement by Mr. D. J. Mather, at the hearings in 1912, that he had known of the lake being 7 or 8 feet lower than it was at low water of the previous year, which would bring low water down to about 1,050, so far as Mr. Mather was able to recollect and as indicated by his testimony on page 132.

Testimony was also offered referring to the construction of the old Rollerway Dam, of the depth of water encountered at the time of the construction of the dam, and the width of the channel at that point. It was stated that the gap was about 150 feet in width. That corresponds to the width shown by the soundings on the cross section at the site of the dam, at an elevation of about 1,051 to 1,051.5. The statement is also made that the piers were about 12 feet deep, and that after they had been placed about the upper 3 feet were exposed above the water. It was also stated that the water in the gap



was about 12 or 15 feet in depth. Now, while these statements are more or less contradictory, yet in a general way they indicate extreme low water, within the recollection of Mr. Mather, as being somewhere in the neighborhood of 1,050 or 1,051. Our computations and records indicate that within the last 21 years the extreme low-water mark was slightly less than 1,053. The precipitation records indicate that in the eighties, possibly 1885, 1886, or 1887, the low water was less than during the last 21 years; that is, less than 1,053. So that extreme low-water mark on the Lake of the Woods may be considered as lying somewhere in the neighborhood of 1,050 or 1,051, possibly 1,051.5, indicating a total extreme fluctuation of something over 10 feet in a state of nature.

Referring again to the result of regulation, I might indicate here, in connection with a statement previously made to the effect that the increase in utilizable outflow under certain methods of regulation is not the full measure of the advantages of regulation, because in the first place the methods of regulation considered assumed practically half the variation in lake level existing under natural conditions. If these studies had been made on the basis of an extreme variation in level of 10 feet, very much more favorable results, even in increase in utilizable outflow, which, as before stated, is only one measure of the advantage of regulation, could have been secured.

Mr. ROCKWOOD. Mr. Chairman, may I call attention to one or two things said by the engineers before, which I think have been misunderstood by some. I desire first, Mr. Meyer, to call your attention to pages 294 and 295 of the printed evidence, beginning near the bottom of page 294. This is with reference to the condition on Rainy Lake. This language is used, "Our computations show, according to these curves, that for the last five years the highest point reached under the condition of control was 497.3, whereas the highest point which would have been reached during the same period of years under natural conditions is something less than 493." I desire to ask if you intended then or at any time to state that the ordinary high-water mark was as low as 493?

Mr. MEYER. No; I did not. I merely stated a fact as to what occurred within a given period of time, and, of course, I would not base my conclusion as to what was ordinary high water on any body of water on the basis of records extending over such a period of time as five years.

Mr. ROCKWOOD. That answers my question. Now, one more question. On page 289 the phrase "old shore line" is used.

Mr. POWELL. That is with reference to the lowlands on the south of the lake.

Mr. ROCKWOOD. That is right. Now the question I wish to ask there is similar. In the use of those words do the consulting engineers intend to express any conclusions as to the line of legal or ordinary high-water mark?

Mr. MIGNAULT. You might put that question to Mr. Tawney. It was he who put the question to the witness.

Mr. TAWNEY. It is not the interpretation of the question that the gentleman wants; it is the interpretation of the answer.

Mr. ROCKWOOD. That is it exactly, Mr. Chairman, whether the engineers have used that language with any definite reference to legal or ordinary high-water mark.

Mr. MEYER. The note on the map, sheet No. 2, for example, indicates exactly what we mean by the old shore line. These words are used:

The broken blue line represents the outer margin of such vegetation as willows and brush growing up to the edge of the deeper water, and, except where modified to correspond with topographic features disclosed by the International Joint Commission survey of 1914, corresponds to the shore line shown on the township map of the United States General Land Office, based on surveys made in 1881 and 1898.

Mr. ROCKWOOD. Now, am I wrong in my understanding that you do not there attempt to define and locate the ordinary high-water mark?

Mr. MEYER. We do not.

The CHAIRMAN. Is there anyone else who wishes to ask Mr. Meyer any questions?

Mr. HILTON. Mr. Meyer, did you intend by the testimony which Mr. Rockwood has referred to, to bring out exactly what you read from the notations upon the maps as to what the broken line meant and the other line meant?

Mr. MEYER. I am not sure that I quite get your question, Mr. Hilton.

Mr. HILTON. Well, you read from the notations upon the maps that the consulting engineers had prepared relative to Rainy Lake and its tributaries?

Mr. MEYER. Yes, sir.

Mr. HILTON. In the note of explanation where reference is made to the shore line did you have reference to the government meander line as shown by the survey of the townships made by the Government in 1881 and 1898?

Mr. MEYER. I indicated that this broken blue line on our map agrees substantially with the meandered shore line as shown on the Government land office maps.

Mr. MAGRATH. Mr. Berkman, are you ready to take up the drainage question?

Mr. BERKMAN. I would be glad to take up the drainage proposition in Beltrami County.

Mr. MAGRATH. Gentlemen, are there any more questions to be asked of Mr. Meyer before we pass to the drainage question again?

Mr. LAIRD. Mr. Meyer, both methods A and B contemplate auxiliary steam plants?

Mr. MEYER. Perhaps there is room for a little misunderstanding there, the idea being that up to a certain point method A does not require the installation of a steam auxiliary, but, of course, any one plant developing a certain amount of power on the river, irrespective of the method of regulation used, may desire to install an auxiliary plant. I think that will clear up the language used by Mr. White yesterday.

Mr. LAIRD. The capacity of the auxiliary steam plant under both methods would differ very much, would it not?

Mr. MEYER. Very considerably for the same total amount of available power.

Mr. LAIRD. Could you express that in any percentage or proportion?

Mr. MEYER. That would be determined by the difference in the minimum flow translated into terms of horsepower. The minimum



flow under method B for these 21 years, I believe, is 7,710 cubic feet per second and under method A, with the same draft on storage, is 10,390 cubic feet per second—both of these figures referring to 5 feet maximum draft on Lake of the Woods and 100,000,000,000 cubic feet of total storage capacity on the Upper Rainy watershed. The combination of methods B on the Upper Rainy and A on the Lake of the Woods and 5 feet of maximum draft within that period of 21 years would give a minimum discharge of 9,260 cubic feet per second, and the difference between those figures multiplied into the fall with the proper coefficient would give the horsepower.

Mr. LAIRD. You have indicated that the nature of the service given by the power plant would have to be considered in determining which regulation would be better. In the case of a manufacturing plant which could possibly manufacture ahead for the supply of its product, method B might be more desirable. In connection with a public-service corporation, for example, in the supply of light or street-car traffic, method A would undoubtedly be more desirable?

Mr. MEYER. That is true on the assumption that the ordinary interruptions such as might occur from lightning, or from sleet falling on the line, from breaks in the transmission line, are unobjectionable. It depends on whether several plants are linked together or whether the consumers are dependent upon one plant; whether the service could stand small interruptions lasting a matter of half an hour or an hour or two hours or perhaps more than that; whether you are only concerned with the maintenance of a given amount of power, in a general way, over that period of years, neglecting the minor interruptions which, to my mind, largely determine the necessity for the steam auxiliary. That is what I referred to when I said some time ago "for other purposes," the practice apparently being to provide a steam auxiliary or stand-by up to possibly 25 per cent of the total capacity, in the case of operating companies who are required to furnish uninterrupted service.

Mr. LAIRD. Even under their best possible method of regulation that would be required.

Mr. BERKMAN. In regard to the levels that would be maintained on the Lake of the Woods and the development of power at the Long Sault, what relation does each additional foot have upon that development—that is, each additional foot on the Lake of the Woods?

Mr. MEYER. It would practically reduce the head at that point very nearly the same amount. That is, a foot increase in lake level backs the water up at the foot of the Long Sault Rapids and reduces the head at that point pretty nearly the same amount, dependent somewhat upon the lake stage that you consider.

Mr. BERKMAN. What is the difference in ratio between the amount of water that runs out of the Lake of the Woods and passes over the Long Sault?

Mr. MEYER. The low-water flow over the Long Sault is greater than the low-water flow out of the Lake of the Woods on account of the evaporation loss as indicated by the records of the past 21 years. The average flow, of course, is considerably greater at the outlets of the lake.

Mr. BERKMAN. How much greater is the average flow?

Mr. MEYER. Possibly in the ratio of 3 to 4—3 at the Long Sault and 4 at the outlets—dependent again upon how much of the flow you are utilizing at the outlet; but the average run-off, whether you utilize it or not, would probably compare in about that ratio, the ratio at International Falls being approximately 10 to 16 at the outlets. Then the intermediate watersheds would furnish some water. That would make the ratio about 11 or 12 to 16. It could be accurately computed. That statement is just an offhand estimate.

Mr. KEEFER. What would be the difference in the value of a foot head at the Long Sault and a foot at the outlet?

Mr. MEYER. If you are considering a development at the Long Sault utilizing the fall of about 10 or 11 feet, it would be more valuable there than at the outlets. That is, the lower the head the more valuable every foot is because it is pretty hard to operate a plant satisfactorily, in any event, under those low heads.

Mr. KEEFER. Then, looking at it the other way, the volume of water, etc., and the height, and increasing that—

Mr. MEYER. That is, a foot of fall with reference to the power and not with reference to the discharge, the other element of value being, of course, the discharge in the ratio that I have previously indicated. I was referring to the fall and not to the power, but the two factors together constitute the available power.

Mr. WYVELL. Assuming that the Lake of the Woods is at a stage of 1,059 sea-level datum, and assuming that there is a flow down the Rainy River of about the natural flow of the watershed for a period of six months or so, how much fall is there between the head of the Soo Rapids and the foot—that is, the total fall?

Mr. MEYER. That is under an average discharge of the river?

Mr. WYVELL. An average discharge of the river.

Mr. MEYER. Of course, the head of the rapids and the foot of the rapids, you understand, are variable quantities. If you were to go there you could not identify them.

Mr. WYVELL. From the head of the rapids until they reach, say, 1,059.

Mr. MEYER. The fall is shown pretty well on one of our maps. I do not recall the day, but I think it represents approximately the average condition. Under an average condition of the river the fall would appear to be about 5 feet, and it varies up to possibly 6 or 7 feet under conditions of higher discharge, the water rising more rapidly above than below in cases of high water.

Mr. WYVELL. Is that all the fall that is available for water-power purposes at the rapids?

Mr. MEYER. No; the water-power development there could include the fall at the Manitou Rapids, which is about  $1\frac{1}{2}$  feet. The fall is a matter of 10 or 11 or possibly 12 feet if the two plants—that is the one at the Long Sault and the one at International Falls—are operated together. Otherwise, the plant at the Long Sault will produce backwater at high water, and in order to prevent producing backwater at International Falls at high water it would be necessary to reduce the head at the long Sault to a point which would make it practically impracticable or uneconomical to develop the site.

Mr. WYVELL. I am assuming that there are ideal conditions, so far as the top of the fall is concerned, and I am arbitrarily taking a level



of 1,059 on the Lake of the Woods. Under these ideal conditions above the rapids and with an arbitrary level fixed at 1,059 on the Lake of the Woods, how much fall would there be down those rapids for practical water-power purposes?

Mr. MEYER. I should say possibly 12 or 15 feet.

Mr. BERKMAN. In that connection Mr. Bartlett testified at International Falls in 1915 that the public works department of Canada in the matter of the Western Canal Co. had recommended a head of about 18 feet.

Mr. MEYER. Can you refer to the testimony? I do not recall that.

Mr. POWELL. You could not get that head without destroying the upper power, could you?

Mr. MEYER. Not so far as I know.

Mr. BERKMAN. It is on page 51 of the Hearings of 1912. The question was whether you were aware of those recommendations.

Mr. MEYER. No; I was not aware of them. Of course, we had the levels of the river so that we knew what the physical possibilities were, and it was on that basis I was making my statement.

Mr. BERKMAN. Then the amount of head that could be utilized there would depend on the level maintained on the Lake of the Woods?

Mr. MEYER. That would be one factor, the other one being the back-water up above at the upper plant.

Mr. BERKMAN. Well, is it not true that the levels of the Lake of the Woods would directly affect the amount of the head that could be maintained?

Mr. MEYER. Almost in direct proportion, as I indicated, a foot rise in lake levels cutting off very nearly a foot of available fall at the Long Sault.

Mr. BERKMAN. If the Lake of the Woods were to be raised 4 feet how much would it cut off? Would it cut off 4 feet of the head of the Long Sault?

Mr. MEYER. A rise of 4 feet would result in reducing the slope somewhat so it would not cut down the head by the 4 feet, but I would not say whether that was  $3\frac{1}{2}$  feet or  $3\frac{3}{4}$  feet, possibly somewhere in the neighborhood of half a foot or more reduction, the fall being very, very slight between the foot of the Long Sault and the Lake of the Woods, varying with the discharge in the river. That was the cause of considerable misunderstanding at Warroad a year ago when I was interrogated on that question, not by yourself, but by someone else.

Mr. MAGRATH. Is there anyone else who wishes to ask Mr. Meyer any questions? If not, Mr. Berkman, you may proceed now.

#### TESTIMONY OF MR. O. L. DENT, OF BEMIDJI.

Mr. O. L. DENT, having been duly sworn, testified as follows:

Mr. BERKMAN. What is your position?

Mr. DENT. Referee in ditch matters in the fifteenth district.

Mr. BERKMAN. Judicial district?

Mr. DENT. Yes.

Mr. BERKMAN. How long have you acted in that judicial capacity?

Mr. DENT. A little over 2 years.

Mr. BERKMAN. And are you prepared to tell the commission the amount of ditches that are tributary to the Lake of the Woods?

Mr. DENT. You mean the amount constructed and those under project?

Mr. BERKMAN. Yes.

Mr. DENT. In Beltrami County is projected and constructed a total, it will be about 1,465 miles, amounting to about \$2,572,000.

Mr. MIGNAULT. Have you any maps?

Mr. DENT. I have in Bemidji, maps with all the ditches.

Mr. MIGNAULT. Maps with all the ditches on, showing the location of the ditches?

Mr. DENT. Yes.

Mr. TAWNEY. What is the acreage?

Mr. DENT. The total number of acres benefited by the work is estimated and brought in by the viewers, 1,371,174.

Mr. TAWNEY. Does that all flow into the Lake of the Woods?

Mr. DENT. Not altogether; it is what I call Hudson Bay water. Some of it goes into Red Lake, a small portion.

Mr. TAWNEY. In Beltrami County?

Mr. DENT. Yes; possibly 350,000 goes in. I have made arrangements with Mr. Meyer to give me all the information from the office on that work. In Koochiching County we have approximately two and a half million of work there.

Mr. TAWNEY. Do you mean that is the cost of the ditches?

Mr. DENT. Yes.

Mr. TAWNEY. What is the acreage of the land in Koochiching County?

Mr. DENT. There are several ditches I have not got tabulated here, but I have a total mileage of around 800 miles, and the total acreage would be about 1,200,000 acres benefited, and the total cost approximately two and a half million.

Mr. TAWNEY. That throws the waters of these lakes into Rainy Lake and Lake Namikin?

Mr. DENT. And Big Fork and Little Fork Rivers.

Mr. MIGNAULT. And the Rainy River?

Mr. DENT. Yes.

Mr. MIGNAULT. How far back from the shore line of these lakes do these ditches extend? If you have a map, perhaps it would explain it.

Mr. DENT. This map shows it about 65 to 80 miles, something like that.

Mr. TAWNEY. In order to give the commission some idea of the topography of the country, what would be the fall, or the level, between the mouth of the ditch and the source of that ditch?

Mr. DENT. I would have to take—

Mr. TAWNEY. Give me an approximate idea of it, so as to get some idea of the topography of the country.

Mr. DENT. It would be rather difficult at this time, unless I take a particular system with the maps, and I will furnish Mr. White and Mr. Meyer the profile, and I think they can work it up very nicely for you. In addition to that, we will try to furnish you with the soundings as to the depth of the muck and the vegetation, as the timber limits have been reported to us and platted; we have maps out on that now



Mr. TAWNEY. Ordinarily speaking, all the territory drained by these ditches into the Lake of the Woods is practically a level country?

Mr. DENT. I would not consider it so, with a fall of 3 feet to the mile. I would not consider that a level country. It is true a great many swamps are the highest point of land, and you take the divide here north of Red Lake, it is about 30 or 40 feet higher [referring to map].

Mr. BERKMAN. Did you state how high the tablelands that divide the waters between the Red Lake and the Lake of the Woods were above the Lake of the Woods?

Mr. DENT. I think it is about 100 feet higher, from this data.

Mr. BERKMAN. And how high is that from the Lake of the Woods?

Mr. DENT. About 50 miles.

Mr. BERKMAN. And you might tell the commission how the assessment for the benefits are made.

Mr. DENT. The assessments are levied according to the judgment of three viewers, as Mr. Willard said, and at this time I would like to offer in evidence lands affected along the shore of the Lake of the Woods as they are assessed by the viewers at this time. It will be noted that some of these lands are now overflowed, and I do not know any way that it could be brought to your attention any better than offering in evidence the maps which I have marked the amount of the assessments on, covering each particular section. The viewers, I think, have labored under the opinion that it was land cleared out to where the Government meander corner was set, and it would also give the commission an idea of the value of the land which the viewers have placed on it.

Mr. TAWNEY. These viewers assess benefits to them?

Mr. DENT. Yes.

Mr. TAWNEY. Resulting from the drainage?

Mr. DENT. Yes, apparently so.

Mr. ROCKWOOD. Did the viewers put a value on the land itself?

Mr. DENT. Only the benefit it will derive from the drainage system working as it is laid out.

Mr. BERKMAN. In ratio with the cost of construction?

Mr. DENT. Absolutely so.

Mr. POWELL. On what basis do they make the assessment? On the basis of acreage or value?

Mr. DENT. On the benefit to the acreage.

Mr. MIGNAULT. Were these ditches constructed according to some general plan?

Mr. DENT. Well, that depends; I think they have a little different system now from what they had in the early days. They try to go more into detail, and we have a general plan that we try to follow at this time, basing it on the precipitation and the soil conditions and the depth of the muck, which would naturally govern the depth of the ditches to a certain extent, in addition to the fall and the place of outlet.

Mr. MIGNAULT. With regard to ditches leading into the Lake of the Woods, what lake level did you consider?

Mr. DENT. That was two years ago; there was a great many of those systems laid out before I came, and I would imagine from the first assumption of the ditches now constructed and under con-

struction, that it was in the neighborhood of 1,056 or 1,057 as the main or probable stage, where, if the lake got to that stage it would outlet conveniently and still get the benefit. Where the lake was up to 1,060, it would probably render inefficient the ditch. If the soil were of a mucky character, it would be inefficient until the grade was raised to probably 4 feet above the backwater.

Mr. MIGNAULT. Did you consider what was the ordinary high water of the Lake of the Woods in planning the ditches?

Mr. DENT. I have tried to consider what is the ordinary high water.

Mr. MIGNAULT. But did you, as a matter of fact?

Mr. DENT. I do not know. I do not know what the high water was.

Mr. MIGNAULT. What figure was estimated as being ordinary high-water mark of the Lake of the Woods?

Mr. DENT. I have always considered high-water mark the height of any place where water may stand for a period of time to kill vegetation; that has been my idea of high-water mark.

Mr. MIGNAULT. What level was there to express it in figures?

Mr. DENT. I have never made an investigation of the entire Lake of the Woods, so I could not express it.

Mr. MIGNAULT. You would not express it?

Mr. DENT. I would not care to express an opinion.

Mr. POWELL. You would not require the entire shore of the Lake of the Woods; two or three hundred yards would be just as good as two or three hundred miles?

Mr. DENT. In that case I think it would.

Mr. POWELL. Have you made an estimate of any limited portion of the shore?

Mr. DENT. Every time I have been to the Lake of the Woods the water has been excessively high; I have found that the water backed up over the ground where trees 12 and 14 inches in diameter are growing; unfortunately it has always been that way every time I have been up in that country.

Mr. MIGNAULT. You have stated that the ditches were planned to outlet on the Lake of the Woods at the level of 1,056 or 1,057?

Mr. DENT. I would imagine so.

Mr. MIGNAULT. Did you take any levels on the lake itself?

Mr. DENT. I have personally taken no levels at the lake.

Mr. MIGNAULT. Do you know whether any were taken?

Mr. DENT. I know in the field notes that levels were run out to the edge of the water by the different engineers. Those field notes, and such as that, are at Mr. Meyer's disposal.

Mr. MEYER. Was the idea in outletting at 1,056 to carry the ditch down far enough so that it would discharge at that point, 1,056 or 1,057, without spreading it over the land?

Mr. DENT. I would imagine so.

Mr. MEYER. And if the level had been 1,056, 1,057, 1,058 or 1,059 at the time the ditch was constructed, would it have been carried down to the water's edge to outlet at that time? Was the fact that it outletted at 1,056 merely coincident with the stage of the water at that time?

Mr. DENT. I could not answer that; Mr. Bourgeois will probably answer that. I do not know what his opinions at that time were;



however, I would imagine he was wanting to make absolutely sure of outletting his water at low-water mark. Naturally an engineer would try to do that.

Mr. MEYER. The 1,056 refers to the bottom of the ditch, if I understand correctly?

Mr. DENT. Yes.

Mr. MEYER. And the fact that the lake level would be more than 1,056, or 1,057 or 1,058, would not prevent the ditch from discharging, or back the water up the lake many miles?

Mr. DENT. No.

Mr. ROCKWOOD. You are not an engineer?

Mr. DENT. I am not a graduate civil engineer.

Mr. TAWNEY. Are these ditches that you have referred to in your testimony all county and judicial ditches?

Mr. DENT. All judicial.

Mr. MIGNAULT. And how far back do they extend on the Lake of the Woods generally?

Mr. DENT. Well, they extend to the height of land, which is about 50 or 60 miles along here.

Mr. MAGRATH. What is the character of the information that those blue prints disclose that you have placed on file?

Mr. DENT. These show the elevations at different points and the amount of assessment on each particular drainage area—

Mr. MAGRATH. Deal with a specific piece of land?

Mr. DENT. It shows each specific piece of land that has been benefited by the viewers, or, rather, that the viewers have found a benefit on.

Mr. TAWNEY. Is the value of the benefit marked on the map?

Mr. DENT. Yes.

Mr. TAWNEY. We do not need that tabulated.

Mr. DENT. Those are the original documents I have here.

Mr. MAGRATH. Take some specific piece of land and say what the benefit is or has been?

Mr. DENT. I will mention the northwest quarter of section 24, range 34, town 163: \$104.97 of benefit found for judicial ditch number 16.

Mr. TAWNEY. How far back from the Lake of the Woods is that located?

Mr. DENT. About a mile and three-quarters from the meander corner.

Mr. TAWNEY. What are the benefits that are assessed on the land adjacent to the Lake of the Woods—

Mr. MAGRATH. Just before you leave that, you are dealing with a 14 acre piece of land?

Mr. DENT. Each tract is 40 acres.

Mr. MAGRATH. So that the benefit is something less than \$3 an acre?

Mr. DENT. Yes.

Mr. BERKMAN. That is the proportionate cost of the ditch system?

Mr. DENT. Yes, certainly. Take section 3, the same town and range, \$163.33—I guess I gave it wrongly: \$163.33 section 31, lot 1, assessment of \$45.01.

Mr. POWELL. How many acres?

Mr. DENT. Forty-nine and ninety hundredths.

Mr. TAWNEY. Is that east of the ditch that runs into Zippel Bay?

Mr. DENT. It outlets north of Zippel Bay and also outlets into Zippel Bay.

Mr. TAWNEY. North of Zeppel Bay?

Mr. DENT. A mile north of Zippel Bay into the Lake of the Woods.

Mr. MIGNAULT. Could you tell me at what level that ditch is supposed to enter the lake?

Mr. DENT. I think Mr. Burgeois will have to tell you that; I have not the data here.

Mr. TAWNEY. Is that the usual benefit that is assessed against land for the county ditches that are on the lake?

Mr. DENT. I could not say as to that; it might vary in each system. It depends entirely on the cost of the system what each proportionate share is, and then I think the viewers take into consideration the road benefits; usually a road is built alongside each ditch out of the spoil bank.

Mr. ROCKWOOD. Will you be kind enough to explain what your duties are as referee?

Mr. DENT. My appointment reads as referee and supervising engineer; I forget the section, but on page 30 of the General Statutes you will find my duties generally defined.

Mr. ROCKWOOD. Page 30 of the General Statutes, 1913?

Mr. DENT. Yes, Minnesota.

Mr. ROCKWOOD. Do you have to do yourself with laying out the ditches, or simply consider them when the plats come in?

Mr. DENT. I act as an advisory court, and naturally oftentimes I offer suggestions, and more to check over the work in a general way.

Mr. ROCKWOOD. You practically do the duty which the judge might do if he did not have too much other work?

Mr. DENT. I could not say as to that; I do not think so.

Mr. ROCKWOOD. Do you go on the ground when the surveys are being made?

Mr. DENT. Very often, yes; if I have instructions from the court to go, I very often go over the ground.

Mr. ROCKWOOD. Have you stated anything, or filed anything, that shows which of these ditches empty into the water above International Falls?

Mr. DENT. I have not; if you desire it I will—

Mr. ROCKWOOD. Have you filed or stated anything which shows which of those empty into the Lake of the Woods?

Mr. DENT. Just those projects; the ones I am filing now are those that empty directly into the Lake of the Woods or Zippel Bay or Wabinica Bay.

Mr. ROCKWOOD. How many are there?

Mr. DENT. I think there are possibly four.

Mr. ROCKWOOD. Those that discharge into streams such as the Big Fork and Little Fork and Black River, and so on, would not be in any way affected by the level of the Lake of the Woods?

Mr. DENT. Only possible overflowage, but I will give those to Mr. Meyer, so that he can take them into consideration.

Mr. POWELL. Is there a commission controlling this matter, or how is it managed?

Mr. DENT. It is entirely in the hands of the court.



Mr. POWELL. How do they get the land? Do they take it and pay for it?

Mr. DENT. The right of way for the ditch?

Mr. POWELL. Yes.

Mr. DENT. The viewers generally put a damage on it and pay for the right of way.

Mr. POWELL. Have you any fixed rate of damage?

Mr. DENT. No fixed rate.

Mr. POWELL. What do you ordinarily pay per acre for damages?

Mr. DENT. I could not say for that.

Mr. TAWNEY. In your experience do you know what they allow for right of way per acre?

Mr. DENT. Why, yes; from \$5 to \$10 or \$12 per acre. It all depends what the conditions are; if they go through a man's field it would possibly be more.

Mr. POWELL. So far as your knowledge goes, the allowance is from \$5 to \$10?

Mr. DENT. I would not want to say, because I would have to go and look it up; I could not say offhand.

Mr. TAWNEY. Do you know of any ditches laid out that would show that—

Mr. DENT. We have all kinds of records down there; Mr. Meyer can go into that.

Mr. MAGRATH. Those records are open to our inspection?

Mr. DENT. Yes.

Mr. ANDERSON. I want to get one or two elevations if you can give them to me. Take township 161, range 35; can you give me that elevation?

Mr. DENT. I have not got that on this map.

Mr. ANDERSON. Look at another map. Take 159, have you that?

Mr. DENT. 161, range 35; I have not got that.

Mr. ANDERSON. What range have you got?

Mr. DENT. 161, range 33.

Mr. ANDERSON. Give me that; I do not know that that is exactly what I want, but give me the highest elevation in it.

Mr. DENT. The highest one I find is about 1,104.

Mr. ANDERSON. I am instructed that, according to one of the exhibits filed, taking township 159, there is an elevation of 1,260; I wish you could verify that from the figures you have got there?

Mr. DENT. I have not got it; possibly Mr. Bourgeois might enlighten you on that.

Mr. ANDERSON. Have you not got it?

Mr. DENT. No.

Mr. ANDERSON. Do you know of two or three summits there in and around townships 159, 160, and 161?

Mr. DENT. About 1,119.7 is the highest point I get on this map.

Mr. ANDERSON. What township and range is that in?

Mr. DENT. It is in range 32, town 161, a mile north of Williams, on range line between 33 and 34, 161, an elevation of 1,151.2.

Mr. ANDERSON. How far is that from the lake?

Mr. DENT. It empties into Bostick Creek; the elevation of this outlet into Bostick Creek is 1,067.7.

Mr. ANDERSON. I am asking you how far from the lake it is?

Mr. DENT. As the crow flies?

Mr. ANDERSON. Both as the crow flies and according as the water would get there.

Mr. DENT. I would say it was about 15 miles in a direct line, and where we empty into Bostick Creek would be about 9 or 10 miles.

Mr. ANDERSON. What outlet do you say that was?

Mr. DENT. Bostick Creek.

Mr. ANDERSON. What height?

Mr. DENT. 1,067.7.

Mr. CAMPBELL. That is the height of the outlet?

Mr. DENT. This does not empty into the Lake of the Woods; this empties into a creek leading to the lake.

Mr. CAMPBELL. How far is that point of outlet from the lake; can you tell me that?

Mr. DENT. I should imagine about 4 miles, something like that.

Mr. CAMPBELL. As a matter of fact, most of your ditches empty into creeks in the first instance, and not directly into the lake?

Mr. DENT. A few of them empty directly into the lake.

Mr. CAMPBELL. But most of them empty into creeks or water-courses?

Mr. DENT. Creeks and rivers.

Mr. CAMPBELL. I want to get a little information if you will be kind enough to give it to the engineers of the commission, as well as giving it to me. I am instructed there are three summits, in 159, 160, and 161; will you get the elevation in those summits?

Mr. ROCKWOOD. What range?

Mr. ANDERSON. I do not know, but Mr. Dent will know where the summit is. I would like to get the elevation and have it put in, and I would like to get the distance those summits are from the lake. You spoke of having been in the neighborhood of some drainage district several times there was high water?

Mr. DENT. Yes.

Mr. ANDERSON. What district was that?

Mr. DENT. Particularly around Zippel Bay and up around that country. •

Mr. ANDERSON. How many times did you visit it?

Mr. DENT. Probably three or four times.

Mr. ANDERSON. And each time you found high water?

Mr. DENT. Generally.

Mr. ANDERSON. Have you any idea how high the water was on those occasions?

Mr. DENT. I was looking it up yesterday and I think it was around 1061.8, something like that about the 15th or 17th of June, 1914; that would probably give you an idea.

Mr. ANDERSON. On those occasions had the water made any impression upon the vegetation?

Mr. DENT. I think probably it had.

Mr. GLENN. Who fixed the value of that land around the judicial ditch?

Mr. DENT. The three viewers.

Mr. TAWNEY. They do not fix the valuation of the land; they assess the benefit.

Mr. GLENN. They do not condemn the land?



Mr. TAWNEY. That is the land taken.

Mr. GLENN. The viewers look at the land and condemn it. Can you give us any idea what that land is valued at within a quarter or half a mile, or a mile from the lake?

Mr. DENT. I would not attempt to place any valuation on any piece of land.

Mr. POWELL. What valuation do these official valuator's put on it?

Mr. DENT. I would think that copies of the viewers' report would show that; I can have them typewritten for you.

Mr. TAWNEY. You can furnish that from the record to Mr. Meyer?

Mr. DENT. Yes.

Mr. CAMPBELL. The reports come through your hands, and I presume are filed in your office, are they not?

Mr. DENT. I have some copies in my office.

Mr. CAMPBELL. Reports made by the viewers?

Mr. DENT. Yes.

Mr. CAMPBELL. Don't you recall any of their contents in any particular case?

Mr. DENT. I would not attempt to set any amount on any particular piece of land.

Mr. CAMPBELL. Can you speak of the range? You might not be able to be specific about any one piece of land, but you might speak of the ranges?

Mr. DENT. It all depends entirely on the system and the cost of the system. If a system for a small area costs \$100,000, it would necessarily be a higher assessment—

Mr. CAMPBELL. I do not mean the benefit assessment, but the assessment for right of way?

Mr. DENT. It would naturally differ in different localities.

Mr. CAMPBELL. Well, within what figures?

Mr. DENT. I say in some of these cases \$5 or \$10 an acre.

Mr. CAMPBELL. For the value of land that the public take—

Mr. DENT. No, that is the damage they put for using the land; no quitclaim deed or anything passed for it.

Mr. POWELL. They took it in perpetuity.

Mr. CAMPBELL. But the ditch destroys the value of the land for any other purpose than that of drainage?

Mr. DENT. I think that would come under the statute for taking right of way for road.

Mr. LAIRD. Are they not put on the road allowances?

Mr. DENT. That is what we aim to do, to keep within the bounds of the 66 feet.

Mr. LAIRD. But you value that, and they allow—

Mr. DENT. No, I think that the damage they allow for taking the land.

Mr. LAIRD. Are there any cases where they leave the road allowance and take private property?

Mr. DENT. If they deviate from the line—

Mr. LAIRD. And in these cases they receive damages for that, as well as on the road allowance?

Mr. DENT. Yes.

Mr. ROCKWOOD. In Minnesota there is no legal road allowance. When the highway is established the land has to be taken from the

owner by his consent or process of eminent domain. There is no legal reserve.

MR. MAGRATH. What is the usual width for the right of way for roads?

MR. DENT. Sixty-six feet.

MR. BERKMAN. On these ditches a road is constructed?

MR. DENT. A road is constructed from the spoil bank.

MR. BERKMAN. And that road is a benefit to the lands immediately adjoining?

MR. DENT. It is considered so if the viewers so find it.

MR. BERKMAN. Well, as a matter of fact, a road alongside of a piece of land is of immense value where roads are scarce?

MR. DENT. I would consider it so; it has a tendency to open up the country.

MR. HILTON. I could not hear your testimony very well, but as I understand your statement, if a drainage project was being put through, where the viewers found a benefit to the land, then each of the property owners benefited would be assessed one-half of what the actual benefit was?

MR. DENT. That would be it.

MR. HILTON. And the fact that a man was assessed, for instance, \$3 an acre as the benefit on account of the drainage, would not indicate whether his land was worth \$3 an acre or \$100 an acre?

MR. DENT. No, sir.

MR. HILTON. And the amount of assessment that is made against a man's land benefited by the ditch bears no relation to what the actual value of the land is?

MR. DENT. Absolutely none, I would say.

MR. HILTON. \$50-an-acre land might be benefited \$3 an acre?

MR. DENT. Yes; or 50 cents an acre.

MR. HILTON. While \$3-an-acre land might be benefited \$2 an acre?

MR. DENT. Yes.

MR. MEYER. Speaking of the construction of the road, I want to know whether, in valuing the right of way—that is, allowing that as a damage to the land—whether they consider in any way the benefit that the road is supposed to be to the lands, or whether that valuation that they place on that right of way is supposed to represent the value of the land, without reference to the fact that the road is being built on that right of way?

MR. DENT. I do not quite understand you, but I imagine that the viewers would find different benefits under the same conditions. I would imagine that in assessing a piece of land they would assess it at what they think it is benefited, regardless of the value of that piece of land. If on one side a field was cleared, they might say the land was benefited.

MR. TAWNEY. It is the damage to the right of way?

MR. DENT. On one side of the right of way it is cultivated and on the other side it is in a state of nature, I would image that the viewer would naturally find a little difference in the amount he would assess one man——

MR. MEYER. But does the existence of the road enter in any way into consideration in determining the damage to the land because of the fact that a certain strip is taken, say 66 feet wide, for the purpose of ditch and road construction?



Mr. DENT. I do not understand.

Mr. MEYER. Do they take specific account of the fact that a road alongside of the man's land is a benefit, and assess it as a benefit, or do they consider it in connection with the assessment of the damage, as far as right of way is concerned?

Mr. DENT. I could not answer that, because I never went with the viewers, or had anything to do with them, other than to check their reports.

Mr. MEYER. That might have a bearing on my mind.

Mr. DENT. I will have the viewers in Bermidji when you arrive there, who will enlighten you on that particular point.

Mr. BERKMAN. Don't you know, as a matter of fact, in most of this north country when roads are laid out that they are petitioned for, and that if it is laid out under the town system that most generally the town board balances the benefits of having a road against the damages?

Mr. DENT. You are right; no question about that. And a ditch, for that matter, is usually petitioned for by the people who expect to be benefited.

#### TESTIMONY OF ADOLPH F. MEYER, CONSULTING ENGINEER OF THE COMMISSION, WHEN RECALLED.

ADOLPH F. MEYER, having been previously sworn, testified as follows:

Mr. BERKMAN. Assuming that you were acting as the engineer under the judicial ditch system, and that 10 miles south of Zippel Bay, an area of 10 square miles, people would petition for a ditch to drain their land, and the only drainage that you would have—that is, the only discharge—would be into the Lake of the Woods, and not into streams, how would you proceed to carry your water to the Lake of the Woods, and how would you dispose of it when you got there?

Mr. MEYER. I am not sure that I quite get the question.

Mr. BERKMAN. It is the same proposition you have been putting to the other engineers several times, and we will just reverse it.

Mr. MEYER. I would make a survey to determine the slopes—and, by the way, I am now speaking not as a drainage engineer, because I do not profess to be a drainage engineer, but just from my general knowledge of what would appear to be proper procedure in that instance—and I would also examine the character of the soil, and consider the effect of possible scour if the slopes were excessive. If the land sloped gradually, so that there was no danger of scour, a very direct route might perhaps be taken. It is usually desirable to follow along the section lines, as I understand it, to permit building a road alongside of the ditch.

In outletting at the Lake of the Woods I would carry my ditches down low enough so that they could discharge into the lake at the lowest stage that I would expect the lake to reach, so that it would not flood the land adjoining the ditch. If the slope was kept low enough so that there was no material scour, and no material amount of sediment carried down by the ditch, then there should be no ma-

terial silting at the junction between the ditch and the lake level, where the dead water would occur, where the velocity would be greatly reduced, at any rate. The wave action, however, might bring in silt and cause more or less difficulty, so far as keeping the mouth of the ditch open is concerned. That would depend largely upon each particular outlet and its physical characteristics. As to the matter of construction, if you have that in mind, too, it might be gathered by the character of the surrounding country: that is as to whether to use a dry-land dredge, a walking dredge, with steam shovel, whatever you designate it, or a floating dredge. That would depend upon the character of the country. A floating dredge could move out from the upper end, keeping the water back of it and could dredge out to get an outlet into the lake beyond the low-water level. In the case of the walking dredge, it would have to stop when it got approximately to the lake level. If the lake level were high at the time, the dredge could not complete the outlet; so that it would be necessary to come in later with the dry land dredge, or floating dredge, to make the outlet on the lake side. I do not know whether that is what you want.

Mr. BERKMAN. That is all right; assuming there is quite a lot of silting, quite a lot of dirt and sand—

Mr. MEYER. I should limit my slopes, in the case where the slope of the land was greater than was desirable for that side of ditch and volume of water, to as flat a slope as possible, so as to prevent the scouring and silting. It is not unusual to put in concrete works which will prevent scouring, and lead the ditch on again at a lower elevation. Some of that might be necessary, but not very often.

Mr. BERKMAN. In the development of a new country, do you think that new country, as it is being developed, would warrant putting in works of that kind?

Mr. MEYER. Seldom, except in the larger ditching; it might be economical to do it in some cases.

Mr. BERKMAN. When your contour of the land would get down to 1,060 and continue on out to the lake at about the same height, how would you do in that case?

Mr. MEYER. If I get your question, the ditch would have a certain depth and the surface of the land would always be at a certain height above the bottom of the ditch, and I can not quite connect up your question with the level.

Mr. BERKMAN. Well, if the level would continue the lake level would be at 1,060 and the land level would be at 1,060, after continuing a mile from meander corner?

Mr. MEYER. At 1,960?

Mr. BERKMAN. Well, approximately, say 1,059 or 1,060.

Mr. MEYER. The water, of course, would spread out, if the level were exactly at 1,060—that is the level of both the land and the water, the ditch could be carried out to where the land was lower till you came to a bank or otherwise, or till you came to land that had some slope to it and carry the ditch out some distance beyond the low-water edge, so that the water would spread out when it had reached the lake surface.

Mr. BERKMAN. Assuming you had been engineer on these drainage projects—



Mr. MEYER. I would not be, unless I had qualified as a drainage engineer.

Mr. MEYER. You interrogated a witness many times, as though you understood something about the proposition?

Mr. MEYER. I did not mean to be sarcastic at all.

Mr. BERKMAN. Assuming you had been drainage engineer on these projects, and that you had known that the Lake of the Woods had been maintained in the past ten years at a very much higher level than would have been the natural level of the Lake of the Woods, and you knew that there was in process and in existence a commission that was to determine the rights of the farmers and the riparian owners as to flooding, and that the lake, instead of being at 1,060 in its natural state, would have been nearer 1,057 for the last ten years, how would you then have laid out your system? Do I make myself clear?

Mr. MEYER. So far as I understand your question, the laying out of the ditch system, when there is more than sufficient slope, is entirely independent of the lake level, until you get into the immediate vicinity of the lake shore, but from that point on, of course, it would be necessary to consider the lake level. If the slope were insufficient, then the effect of the lake level might extend to very considerable distances back, but when ditches are in operation, as one or two have been lately, and the slopes are 4 or 5 feet in the country adjoining the lake, I would not worry about the lake level till I got to the immediate vicinity of the water's edge, and at that point, of course, it would be necessary to take the level into consideration with respect to the point at which you would outlet, to carry on your dredging operations.

Mr. BERKMAN. Would you have laid out the systems any different then from the plan that Mr. Bourgeois described on the lake shore when he testified last fall?

Mr. MEYER. So far as I am familiar with the plans—I am speaking particularly from that point back from the immediate shore, the ditch systems all seem to be laid out, following in a general way, the natural ground surface, and constructed apparently up to the water's edge, and the water now stands, when it is at 1,060 or 1,061, in these ditches. They apparently were constructed either with a floating dredge, or with a land dredge at a lower stage.

Mr. BERKMAN. What I want to get at, would you proceed on any other method in laying out the work, in discharging into the lake, other than was outlined by Mr. Bourgeois at the September hearing at Warroad?

Mr. MEYER. I prefer to have that testimony better in mind than I have it now, because I have not read it since the time the testimony was given, and, as I indicated before, I did not think the matter of the outlet had any material bearing on the lake level.

Mr. BERKMAN. As I take it, the commission was very much confused about the discharge, and they thought the whole system was wrong?

Mr. MEYER. And I do not think so at all. I think there is sediment in those ditches, because the soil is such that there is more or less scour; that is, the slopes are greater than they need be. It would be better if the land were flatter, so that the slopes would not be so great near the lake shore, that the water would not carry

down so much sediment, but it may not be feasible to construct the ditch at a flatter slope, because they follow the section line.

Mr. MAGRATH. They could put in drops, could they not?

Mr. MEYER. Oh, certainly; the expense might not be very great.

Mr. WYVELL. We visited one ditch when we were out there?

Mr. MEYER. Yes.

Mr. WYVELL. Was that ditch constructed, as far as you know, as you would have constructed the ditch, if the matter were given in your charge—

Mr. MEYER. As far as the lake level was concerned, I can not see how it would have any bearing on the construction of the ditch. It was apparent that the ditch was scouring very considerably. It was carrying down a good deal of sediment, and it would drop that sediment wherever it reached the lake level, but if the lake were low it would drop it further down.

Mr. WYVELL. You remember we did see some water running up the ditch?

Mr. MEYER. It was standing water.

Mr. WYVELL. Would you have had the depth of the ditch at the point where it is nearest the lake any different than about 1,056?

Mr. MEYER. It did not stay very long, even if it was built at that; so that it did not make very much difference exactly what that bottom elevation was, because it immediately silted up on account of the fact that the slopes were steep.

Mr. WYVELL. I merely want to get this one thing straightened out now. As I understand it, you would have had the bottom of your ditch far enough down so that it would have discharged into the lake had the lake been at 1,056, knowing that the lake might have reached 1,056?

Mr. MEYER. Yes, even knowing that it would carry enough silt in operation to silt up; but I would have endeavored to prevent the slope.

Mr. DENT. Would you have put the slopes to an easy gradient, and incurred the cost in a new country like this?

Mr. MEYER. That increased cost of construction would have to be balanced against the disadvantage of having the ditch silt at the lake level, irrespective of where that lake level is, whether 1,058, 1,059, or 1,060, or 1,061, or 1,062, wherever the ditch reaches the lake and the ditch carries silt, the reduction in the velocity of the current is going to cause a deposit of silt.

Mr. DENT. Assuming we have a ditch elevation at 1,060, and we find at the point of outlet, at the head of water, 1,061 and later the commission would set a level for the lake of 1,058 or 1,057, would you have attempted to prepare for the cost of excavating that ditch, excavating the silt and débris that had come down and lodged there? Would you have attempted to have entailed that cost, or rather put it in your estimate which would be taken into consideration in dealing with the question?

Mr. MEYER. I do not know that I catch your question, but that silt would be deposited there, irrespective of lake level, being dependent only on slope and the fact that it did bring the sediment down, it is going to be deposited there.

Mr. DENT. I agree with you, but the point I am trying to bring out is this: That where the lake fluctuates, as it does at this time, it



seems to me that it is impossible for any engineer to determine what the cost of taking out that silt is going to be when this matter is finally adjusted.

Mr. MAGRATH. What bearing has the elevation of the lake on the silt? The silt is due to the fact that you have a ditch with a very great fall.

Mr. DENT. If the level of the lake is lower, or practically the same level as your outlet, it will practically clear itself to a certain extent. I think you will agree with that. The point I am getting at is where these systems are going to get money to take care of these propositions, if the lake is kept up to this point.

Mr. MEYER. I thought we had concluded the silt would be there, no matter what the lake level would be, I do not quite see what your question is. The silt would be there, irrespective of lake levels.

Mr. DENT. A certain amount of it.

Mr. DENT. As these ditches are now constructed, Mr. Meyer, we have what we term a "blind outlet."

Mr. MEYER. If they are constructed during the high-lake stage, and the stage afterwards drops, you have a blind outlet, and then the water would spread out over the land unless the ditch were carried down to the low stage.

Mr. DENT. That is the condition as it exists now?

Mr. MEYER. If the lake stage is high, at some time in the future, and that ditch carries down silt, it will again deposit its silt and close the ditch, or pretty nearly so, where it does intercept the lake level, and you will again have a blind ditch, whether you build it down to 1,056 or not.

Mr. DENT. There are no ditches constructed that I know of in this country that do not silt.

Mr. MEYER. I have no quarrel with that whatever. I am merely trying to indicate that I do not see the relation between lake levels and silting, except that it is a necessary evil, to be contended with, apparently, with high lake levels, and I would be glad to have a statement indicating that it does not exist at some one level or other.

Mr. POWELL. It does not seem to be a very difficult question. If you two gentlemen can not settle it, I think we can very quickly.

Mr. DENT. Well, the commission has spent lots of time on this very proposition with other engineers.

Mr. POWELL. No, not the commission.

Mr. DENT. We thought that if we would take the commission's engineers they would understand.

Mr. POWELL. The commission's engineer has told you that he does not profess to be a drainage expert.

Mr. DENT. He has shown that he has the foundation by his remarks in interrogating the witnesses, so far as that is concerned. I might say that I would be glad to furnish Mr. Meyer with any information.

Mr. MEYER. And I am sure that that information will be of considerable assistance, and we would be very glad to have it.

Mr. MAGRATH. Who is going to take up the power interests first?

Mr. CAMPBELL. I believe I can go on for some time, Mr. Chairman, with some commercial statistics. It was thought that those who are power users would present facts as to their plants, the amount of

production, and the amount of consumption, leaving it to the engineers, who have been retained to go over the plants, to come in later.

Mr. WYVELL. Mr. Chairman, may I make a brief statement which, before coming here, I was under instructions to make? I wanted to make it at what seemed to be an appropriate time, and as Mr. Meyer referred to the possibilities of taking into consideration the power interests after the waters of the Lake of the Woods reached the Winnipeg River, I thought that after he had made that statement, and after these other little preliminaries had gotten out of the way, this might be an appropriate time to make a brief statement of what the view of the United States Government is with reference to the power interests below the point where the outlets reached the Winnipeg River.

I am instructed to say that it is the view of the Government of the United States that waters which do not affect the level of the Lake of the Woods, or which do not immediately flow therefrom, are not within the terms of the reference; that is, that after the waters of the Lake of the Woods have left the outlets of said lake at or near Kenora they have passed beyond the scope of the reference, and the consideration of the possible use of said waters, after they reach the Winnipeg River, is immaterial as far as the purposes of the reference are concerned.

Mr. TAWNEY. Mr. Wyvell, is this not in effect a modification of the reference?

Mr. WYVELL. No, indeed; it is an interpretation of the terms of the reference.

Mr. TAWNEY. Should not the other Government have been consulted as to the interpretation? If this comes from the Government of the United States as an interpretation of its own reference, that interpretation should also have been submitted to the Canadian Government for that Government to acquiesce in it, just as we did in the pollution investigation. The commission was in doubt when the pollution reference came to it as to the scope of the investigation contemplated in the reference; so the commission referred the reference back to the two Governments for their interpretation and they united in an interpretation of the reference. Now, if the Governments wish to limit, restrict or place an interpretation for the benefit of the commission on this reference, of course it is within their power to do it. Are we to consider it the interpretation as expressed by one Government when that Government has not consulted the other Government who is a party to the reference?

Mr. POWELL. I rather regard it as a contention of the United States made through its counsel.

Mr. WYVELL. It is the view of the United States. I am not certain as to the importance of this view. The suggestion that this view might be taken was made at Kenora. Since then I have had an opportunity of discussing the matter with Mr. Anderson, who was then connected with the State Department, with our solicitor and others who had studied the question—

Mr. TAWNEY. I understood you to say that this was an interpretation of the reference by the Government of the United States.

Mr. WYVELL. Yes, sir.

Mr. TAWNEY. And you were instructed to express that interpretation?



Mr. WYVELL. I was instructed to express that interpretation.

Mr. TAWNEY. But the United States Government, if it wanted to place an interpretation upon its reference, should, before submitting the interpretation to the commission, have referred that interpretation to the Canadian Government in order to settle the question between the two Governments, as was done in connection with the pollution reference.

Mr. WYVELL. It is not to limit the reference; it is merely our view of the situation. I am not certain that the Canadian Government takes a different view. I do not know about that.

Mr. GLENN. Read the wording there, Mr. Mignault. You have it there.

Mr. MIGNAULT. The wording is as follows:

In order to secure the most advantageous use of the waters of the Lake of the Woods and of the waters flowing into and from that lake on each side of the boundary for domestic and sanitary purposes, for navigation and transportation purposes, and for fishing purposes, and for power and irrigation purposes, and also in order to secure the most advantageous use of the shores and harbors of the lake and of the waters flowing into and from the lake, is it practicable and desirable to maintain the surface of the lake during the different seasons of the year at a certain stated level; and if so, at what level?

Paragraph 3 of the reference reads as follows:

In what way or manner, including the construction and operation of dams or other works at the outlets and inlets of the lake or in the waters which are directly or indirectly tributary to the lake or otherwise, is it possible and advisable to regulate the volume, use, and outflow of the waters of the lake so as to maintain the level recommended in answer to question 1, and by what means or arrangement can the proper construction and operation of regulating works or a system or method of regulation be best secured and maintained in order to insure the adequate protection and development of all the interests involved on both sides of the boundary, with the least possible damage to all rights and interests, both public and private, which may be affected by maintaining the proposed level?

Now, Mr. Wyvell, I take it that the terms of the reference are in no wise modified?

Mr. WYVELL. No.

Mr. POWELL. Can we not consider it when we take the matter up later?

Mr. WYVELL. I do not wish to argue the matter.

Mr. POWELL. You are simply stating it as a lawyer will state a point in a case.

Mr. WYVELL. I merely make this point and the commission can take it under advisement. If they find the point good, at a later time they will act.

Mr. MIGNAULT. You submit what your views are as to the meaning of the language of the reference that I have just—

Mr. WYVELL. Yes, sir. For the sake of order I thought it would be well to put it in now.

Mr. POWELL. You do not take the stand on behalf of the United States to put that interpretation on it until we back out?

Mr. WYVELL. Absolutely not.

Mr. POWELL. You simply submit that to us as a view that the United States, through you, takes of the language of the reference, and then it is for us to make up our minds or reserve a point for consideration later?

Mr. WYVELL. That is it.

Mr. ANDERSON. Mr. Chairman, before the power interests are heard I thought every other interest was to be heard. I wondered whether there were any other interests here now to be heard.

Mr. POWELL. The chairman has asked three or four times if there are any others here to be heard.

Mr. CAMPBELL. Your honors released for our inspection this morning a report obtained by the engineers and I think a special one by an officer from the State board of health. An engineer for the city has been examining that during the day. He may have some comment to make, but from the glance I made over it I think it will be very brief. We will not differ very much from what the State officer seems to be reporting.

Mr. TAWNEY. In this connection, I desire to ask, Mr. Rockwood, if at the instance of the Minnesota & Ontario Power Co., or any other of the many companies that you represent, in this investigation you have had an officer from the University of Minnesota making an investigation of the village of Warroad and the question of drainage and sewage disposal there?

Mr. ROCKWOOD. No, Mr. Commissioner, we have not.

Mr. TAWNEY. It was stated to the commission somewhere that you had.

Mr. ROCKWOOD. I can state exactly the facts about that.

Mr. TAWNEY. I only wanted to know because I thought if you had we might put the report in at the same time.

Mr. ROCKWOOD. No; we have not, but we agreed on Mr. Fuertes.

Mr. CAMPBELL. He is now examining the report.

#### TESTIMONY OF MR. J. G. GLASSCO, OF WINNIPEG, CANADA.

J. G. GLASSCO, having been duly sworn, testified as follows:

Mr. CAMPBELL. You are manager, Mr. Glassco, of the light and power department of the city of Winnipeg?

Mr. GLASSCO. I am.

Mr. CAMPBELL. What is the source of the city department's light and power?

Mr. GLASSCO. Water power on the Winnipeg River.

Mr. CAMPBELL. At what place?

Mr. GLASSCO. Point Du Bois, Manitoba.

Mr. CAMPBELL. That place, Point Du Bois, is on the Winnipeg River below the junction with that river of the English River?

Mr. GLASSCO. It is.

Mr. CAMPBELL. I believe that between the outlets of the Lake of the Woods to Winnipeg River and the place where the English River flows into the Winnipeg there is one good site for power; there is one rapid, the White Dog Rapids.

Mr. GLASSCO. That is all, only one.

Mr. CAMPBELL. When did the city begin to build its hydroelectric plant?

Mr. GLASSCO. In 1907.

Mr. CAMPBELL. When did you begin selling electrical energy?

Mr. GLASSCO. In October, 1911.

Mr. CAMPBELL. Had anyone else preceded you with hydroelectric power?



Mr. GLASSCO. The Winnipeg Electric had been serving.

Mr. CAMPBELL. When did they begin?

Mr. GLASSCO. To the best of my knowledge, they started selling energy from their hydroelectric plant in 1906 or 1907.

Mr. CAMPBELL. What has your plant cost the city to date?

Mr. GLASSCO. Some \$7,400,000.

Mr. CAMPBELL. Can you distribute that as regards hydroelectric construction, transmission and distribution?

Mr. GLASSCO. The hydroelectric plant, including the power site at Point Du Bois, and the transmission line has cost to date about four and a quarter millions; the distribution system within the city about three millions.

Mr. CAMPBELL. When the power gets here what is it used for? What are the various purposes for which it is used?

Mr. GLASSCO. We serve the domestic lighting customers, commercial lighting, power, cooking, heating, and miscellaneous sign lighting.

Mr. CAMPBELL. You are speaking now of people who are your customers—people or corporations. You have use for it for public purposes—for civic purposes. What are they?

Mr. GLASSCO. That is true; we serve the public utilities, such as power for the waterworks and for the civic street lighting.

Mr. CAMPBELL. And the lighting of civic buildings?

Mr. GLASSCO. For all civic utilities.

Mr. CAMPBELL. And you charge each department with what you think is a fair price for the power they use?

Mr. GLASSCO. We have a schedule of rates which is applied without discrimination to the civic utilities the same as our private customers.

Mr. CAMPBELL. You commenced selling in 1911?

Mr. GLASSCO. In October, 1911.

Mr. CAMPBELL. You commenced preparing to get customers a little while before your plant was completed?

Mr. GLASSCO. Unfortunately, our distribution system was behind the power-construction end of the plant and we were not in a position to take on very many customers at that period.

Mr. CAMPBELL. What was your total revenue the first full year of operation?

Mr. GLASSCO. A trifle over half a million.

Mr. CAMPBELL. That would be for the year 1912.

Mr. GLASSCO. The calendar year of 1912.

Mr. CAMPBELL. Have you got the figures for 1913 and 1914?

Mr. GLASSCO. Approximately, in 1913 they increased to \$775,000; in 1914, to \$875,000.

Mr. CAMPBELL. What was it for 1915?

Mr. GLASSCO. \$975,000.

Mr. CAMPBELL. Now, here you will have to help me out a little and explain if my questions do not carry the full significance for which you want to give answers. How much hydrohorsepower are you now selling, or were you selling during 1915?

Mr. GLASSCO. Twenty-five thousand.

Mr. CAMPBELL. How many customers did you supply?

Mr. GLASSCO. Thirty-four thousand.

Mr. CAMPBELL. That signifies that a very large majority of them were the owners or the occupants of private houses?

Mr. GLASSCO. Yes; out of the 34,000 there would be some 28,000 domestic consumers, some 4,000 commercial lighting, approximately 1,000 power customers, and another 1,000 cooking and heating.

Mr. MIGNAULT. That is in the city of Winnipeg?

Mr. GLASSCO. I might say that about 1 per cent, perhaps, would be within contiguous municipalities.

Mr. CAMPBELL. The city, I believe, has the right to do business outside of its territorial limits?

Mr. GLASSCO. Yes, sir; in the municipalities of Transcona and Kildonan.

Mr. CAMPBELL. Now, Mr. Glassco, give me, in round figures, what the city is charging, say, first, for the electric lighting, the charge per unit—that is, the unit that you measure by or render your accounts by.

Mr. GLASSCO. We charge a straight meter rate of  $3\frac{1}{4}$  cents for domestic lighting with a discount of 10 per cent for prompt payment.

Mr. CAMPBELL.  $3\frac{1}{4}$  cenes for what?

Mr. GLASSCO. Per kilowatt hour with a 10 per cent discount for prompt payment.

Mr. CAMPBELL. That would make a net figure of 3 cents per kilowatt hour.

Mr. GLASSCO. Exactly.

Mr. CAMPBELL. Have you a list of rates of charges?

Mr. GLASSCO. For our power customers we have a schedule of rates starting at 3 cents and going as low as half a cent per kilowatt hour, depending on the amount of consumption and their connected load; and also the amount of the municipal bill; that is, a large consumer who uses a great deal of his power continuously gets a very much lower rate than the consumer who uses his power only infrequently. The average rate for our power customers is about  $1\frac{3}{4}$  cents per kilowatt hour.

Mr. POWELL. Mr. Campbell, what is the point of going into this thing so minutely? Is not the main object to show the extent of your work?

Mr. CAMPBELL. That is the main object. I will cut that short, Mr. Commissioner. In a word, Mr. Glassco, the reason you discriminate in power prices is because if someone only turns on his power switch two or three times a day out of the 24 hours he is not a very good customer, even at 3 cents, as against a man who wants it all day?

Mr. GLASSCO. That is the theory we have established in our schedule of power rates.

Mr. CAMPBELL. Your wheels have to keep turning around all the time whether you get pay for it or not. You are now producing and selling 25,000 horsepower. What is your fall at the river?

Mr. GLASSCO. In feet?

Mr. CAMPBELL. Yes.

Mr. GLASSCO. A normal drop of 45 feet.

Mr. CAMPBELL. About how many cubic second feet are you using?

Mr. GLASSCO. We are not exceeding 4,000 or 5,000 cubic feet per second at the present time.

Mr. CAMPBELL. And up to the present, therefore, provided they do not shut off the water at the outlets of the Lake of the Woods,



you are not in any danger of being short of water even at the low stage?

Mr. GLASSCO. None, whatever, at the present stage.

Mr. CAMPBELL. What is your total layout or arrangement for development of power?

Mr. GLASSCO. The ultimate development of our plant calls for the installation of 100,000 horsepower.

Mr. CAMPBELL. Can you briefly compare the cost of this power to you as against the cost of electric energy by steam generation?

Mr. GLASSCO. I assume, of course, that you mean what our energy would cost us if we generated from a steam plant alone and without any hydroelectric plant.

Mr. CAMPBELL. Yes.

Mr. GLASSCO. Last year we generated, or rather we delivered in the city, some 60,000,000 kilowatt-hours at a cost of seven-tenths of a cent. I estimate that if we had delivered this energy from a steam plant the cost would have been about a cent and a quarter per kilowatt-hour, or rather a cent and four-tenths, I should say. That would mean a saving of seven-tenths of a cent per kilowatt-hour. For 60,000,000 kilowatt-hours that comes to about \$420,000 per annum.

Mr. ROCKWOOD. In saving.

Mr. CAMPBELL. As between steam-produced electric energy and the hydro. About what is the average revenue you obtain from each domestic customer per annum?

Mr. GLASSCO. \$11.50 a year.

Mr. CAMPBELL. What is the average from each of your power customers?

Mr. GLASSCO. The power customer averages about \$450 a year.

Mr. CAMPBELL. Now, give me, if you can, from census and other returns—of course, there being only one census here that would be the official one—the city's population since the electric railway commenced to furnish hydroelectric energy.

Mr. GLASSCO. For 1906 or 1907, the date when hydroelectric energy from the Winnipeg Electric was begun, the population of the city is given as 111,000.

Mr. CAMPBELL. What would it be, say, in 1913?

Mr. GLASSCO. In 1913 the population had increased to 184,000.

Mr. CAMPBELL. In 1914?

Mr. GLASSCO. Two hundred thousand in 1914.

Mr. CAMPBELL. And last year it was approximately the same?

Mr. GLASSCO. There was very little change.

Mr. CAMPBELL. If there was any change there was practically a slight falling off. Now, I would like you to tell the commission what is your estimate of the total production for machine use of power in the city just before 1907, whether it was electrical power produced by steam engines or whether it was machinery driven direct by steam engines.

Mr. GLASSCO. I can not give any very reliable figures for 1907, but I can give you some definite information beginning with 1911. That is the year previous to the selling of electric energy by the city.

Mr. CAMPBELL. Give us that, then.

Mr. GLASSCO. In 1911, I believe, the Winnipeg Electric Railway Co. generated a trifle under 100,000,000 kilowatt-hours. That was

their total electrical output. In 1915 the combined output of both plants exceeded 200,000,000 kilowatt-hours. That is, between the years 1911 and 1915 the consumption of electrical energy increased 100 per cent, the population during that period increasing only 25 per cent.

Mr. CAMPBELL. Now, to what is that rapid increase in power, quite disproportionately excessive as compared to the ratio of population increase, largely due?

Mr. GLASSCO. There is no doubt that the large increase in electrical consumption is due to the unusually low rates prevailing; also partly to the substitution of electricity for steam in individual plants, but more largely it is accounted for by the opening up of new fields for electrical appliances, such as electric stoves, vacuum cleaners, percolators, toasters, and irons, the prevailing low rates enabling electrical service for these appliances to compete successfully with gas or coal.

Mr. CAMPBELL. There are some other questions regarding peak load and load factor which we have not come to yet, concerning which I will not trouble Mr. Glassco, the manager, who, although he is an engineer and has studied the question from that point of view, has only had an academic interest in it so far as the Winnipeg power is concerned. Perhaps your engineers may want some information on that point.

Mr. GLENN. Mr. Glassco, what did you say your capacity was in horsepower?

Mr. GLASSCO. At the present moment or ultimately?

Mr. GLENN. Now.

Mr. GLASSCO. 25,000 horsepower.

Mr. GLENN. You are using 25,000 horsepower?

Mr. GLASSCO. We are selling that much, but we have the installation and could sell to-day 50,000 if we had the market for it. 25,000 horsepower is the maximum demand from our customers, but we can carry 50,000.

Mr. GLENN. How much could you furnish with the level as it now is?

Mr. GLASSCO. How much can we give here in the city?

Mr. POWELL. What is your potential power at the present level of the Lake of the Woods without regulation?

Mr. GLASSCO. At the present time we are quite independent of any regulation of the Lake of the Woods waters; that is, as far as the shortage of water is concerned.

Mr. POWELL. But you said a few moments ago you could install 100,000 horsepower.

Mr. CAMPBELL. Explain the difference between what you have put generators in for and that for which you have put in the solid masonry construction; the 50,000 and the 100,000.

Mr. GLASSCO. There is the 50,000 horsepower that will ultimately go in when the plant is developed for which all the hydraulic work has been completed. That was necessary. But no further extension is contemplated, however, until our load materially increases. Then we will extend our buildings and put in the additional units.

Mr. GLENN. You have 75,000 horsepower that you could use but are not using now?

Mr. GLASSCO. Yes; we will have 100,000 horsepower ultimately. We are selling 25,000 now and we could sell 50,000.



Mr. WYVELL. Mr. Glassco, you are selling all the horsepower that there is a demand for now, are you not?

Mr. GLASSCO. Yes, sir.

Mr. WYVELL. How many cubic feet per second of water are you using now? How many do you require to produce the 25,000 horsepower?

Mr. GLASSCO. That question is rather difficult to answer. It depends, to a certain extent, on what is known as our load factor. Do I understand you to ask for the continuous 24-hour flow in cubic feet per second that we require?

Mr. WYVELL. I want to know how many cubic feet per second you are required to have in order to produce 25,000 horsepower, assuming that you sell 25,000 horsepower every day.

Mr. GLASSCO. Three thousand.

Mr. WYVELL. How far from the city of Winnipeg is your plant located?

Mr. GLASSCO. Seventy-seven miles.

Mr. WYVELL. That is nearer Winnipeg than the English River, is it not; that is, your plant is located between Winnipeg and the English River?

Mr. GLASSCO. It is in a different direction.

Mr. WYVELL. It is located on the river at a point lower down than the point where the English River meets the Winnipeg River?

Mr. GLASSCO. It is.

Mr. WYVELL. I suppose we might offer one of these maps in evidence.

Mr. CAMPBELL. There is no doubt about that.

Mr. WYVELL. Will you mark the place where your plant is, Mr. Glassco?

Mr. ANDERSON. There will be a plan put in later showing that information.

Mr. WYVELL. Mr. Glassco, when you reach your ultimate development of 100,000 horsepower, what flow, stated in terms of cubic feet per second, will you require?

Mr. GLASSCO. I should estimate that at say 18,000 cubic feet per second.

Mr. WYVELL. Well, it only takes 3,000 cubic feet per second to make 25,000 horsepower.

Mr. GLASSCO. I would like to correct that 3,000 to 4,000. The load that we will ultimately develop will not be of the same character as our present load. At the present time we are in our infancy, you might say, and we have not had time to develop or refine what is known as our load factor. We are selling 25,000 horsepower at the present time, but our average load is very low; it is not more than 5,000 or 10,000 over a period of 24 hours. Our average load will be 60,000 or 70,000 horsepower when our peak is 100,000; that is, the continuous flow into the Winnipeg River required for that 100,000 horsepower is not in proportion to that required for the 25,000 horsepower. We have developed our plant out there with a large reservoir capacity up in the river, and if we could get 18,000 second-feet 24 hours a day it would go into our pondage, and when our peak load comes on we will take as much as 26,000 cubic feet out of that. When the load is on the pond will go down 2 or 3 feet in its level,

and during the earlier hours of the morning, when our load is light, it will fill up again.

Mr. POWELL. How many second-feet are you using at the present time?

Mr. GLASSCO. I stated previously 3,000, but I was slightly in error. It is nearer 4,000. It is between 3,000 and 4,000.

Mr. WYVELL. Is that the average per day?

Mr. GLASSCO. Yes; over the period of a year anywhere from 3,000 to 4,000 feet would represent a fair average.

Mr. WYVELL. At the time of your peak load, Mr. Glassco, how many cubic feet per second are you using?

Mr. GLASSCO. Six thousand five hundred would be going through the turbines.

Mr. WYVELL. Did you state how much head there was, how much fall there was?

Mr. GLASSCO. There is a normal head of 45 feet.

Mr. CAMPBELL. You have done all the hydraulic work, the stone construction and concrete work, that will be necessary for the full installation?

Mr. GLASSCO. We have completed that entirely.

Mr. CAMPBELL. And you have installed electrical generators and other machinery for double your present producing capacity?

Mr. GLASSCO. Bringing it up to nearly 100,000 horsepower.

Mr. CAMPBELL. If the market justifies the city in installing the balance within the course of a few years, will the then cost to the city be less per kilowatt hour for producing it than it is now?

Mr. GLASSCO. Very much.

Mr. CAMPBELL. Why?

Mr. GLASSCO. For the simple reason that the large proportion of our present expense consists of overhead charges, fixed charges on a very heavy capital investment, a large proportion of that money having been spent on dams and weirs and outer works that are required for ultimate development. When we complete that development we will be able to bring in power to Winnipeg and deliver it to the city for not much more than a quarter of a cent per kilowatt hour. At the present time it is costing us seven tenths of a cent per kilowatt hour.

Mr. ANDERSON. Mr. Glassco, for Gov. Glenn's benefit, are you a pessimist or an optimist? I mean, are you an optimist as to the future demand for power in the city of Winnipeg?

Mr. GLASSCO. Well, I have no particular opinion to express as to what the market will be for power, but it is only a question of time. I have no doubt that perhaps a full development of our plant will be required before the low water season comes in the Lake of the Woods.

Mr. ANDERSON. Judging by the increase in your few years of operation, the demand for power is growing very rapidly?

Mr. GLASSCO. Speaking of power only.

Mr. ANDERSON. I am not speaking of power only; I am speaking of power and light.

Mr. GLASSCO. Yes; the demand for electricity has increased very rapidly.

Mr. CAMPBELL. Notwithstanding the fact that the years 1914 and 1915 were years of some business depression?



Mr. GLASSCO. Yes. Our revenue from the civic plant has shown a slight increase since the war broke out.

Mr. ANDERSON. Where is the source of supply of water power for the city of Winnipeg? I mean, is there any other practical supply than from the Winnipeg River?

Mr. GLASSCO. There are several other water-power developments on the river.

Mr. ANDERSON. You do not catch my question. Is there any place else from which the city of Winnipeg can get water power except from the Winnipeg River as a commercial proposition?

Mr. GLASSCO. None that I know of.

Mr. KEEFER. Has the Province of Manitoba any other source practically worth speaking of than the Winnipeg River—that is, the settled portion of it here?

Mr. GLASSCO. There are small developments on the Assiniboine River, but they are not of very much importance compared with the developments on the Winnipeg.

Mr. CAMPBELL. Where are they?

Mr. GLASSCO. There is a development on the Assiniboine at Brandon and another at Portage la Prairie.

Mr. ANDERSON. There is none at Portage la Prairie.

Mr. GLASSCO. There is one at Minnedosa. But they are very small.

Mr. MEYER. Have you any records of interruptions in service due to any transmission-line trouble or trouble at the plant during the past year since the plant has been in operation?

Mr. GLASSCO. During our four years of operation we have had one serious interruption. In fact, I might say only one beyond a momentary interruption. That occurred last November 8. On that day we were without energy here for 24 hours. It was due to the failure of our transmission line, one of our flexible towers having been demolished by a sleet storm combined with heavy winds.

Mr. MEYER. How long were those momentary interruptions that you speak of?

Mr. GLASSCO. They varied from 2 or 3 seconds to different fractions of a minute, caused merely by the necessity of throwing over our load from one circuit to another.

Mr. MEYER. You have two circuits?

Mr. GLASSCO. We have two on a steel power line.

Mr. MEYER. Do you contemplate duplicate transmission lines over different routes?

Mr. GLASSCO. Not over different routes. We have already partially completed our second power line on the same right of way.

Mr. MEYER. Did this sleet storm extend over a large area of territory?

Mr. GLASSCO. It was more severe for a stretch of about 7 miles, between the city and the town of Tindell.

Mr. MEYER. Was that a belt 7 miles in width extending some distance in an easterly and westerly direction?

Mr. GLASSCO. It was blowing almost at right angles to our line; that is, the wind would be coming from the northwest.

Mr. MEYER. Have you any interconnection with any other plant owned or controlled by any other corporation, either water power or steam, to use in case of emergency?

Mr. GLASSCO. The city itself has a nucleus of what will eventually be a large stand-by steam plant. At the present time it consists of about 1,500 kilowatts and is used primarily for protection to our waterworks.

Mr. MEYER. For insurance purposes, as an underwriters' requirement?

Mr. GLASSCO. Yes; although for insurance purposes we have a high-pressure plant as well, which supplies the water power for the business section.

Mr. MEYER. Has any attempt been made to operate the two plants that are at present in operation on the Winnipeg River and the existing steam plant in the city in cooperation to guard against interruptions in the service?

Mr. GLASSCO. That proposal has been suggested on several occasions by different public officials, but no definite action has yet been taken.

(The commission thereupon, at 5.40 o'clock p. m., adjourned until 10 o'clock a. m., February 3, 1916.)

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THURSDAY, FEBRUARY 3, 1916.

Pursuant to adjournment, the commission met at 10 o'clock a. m.

Mr. LAIRD. Mr. Chairman, before going into the question of the power interests of my clients, there is another matter to which I wish to call attention. At the hearing at Warroad a suggestion was made of obtaining from the registry office, for the information of the commission, records as to conveyances and sales of lands within the district affected by the reference. Since that hearing I have had the records of the registry offices of those two counties searched for a period of three years and have obtained certified copies of the conveyances; that is, where there apparently were sales of land outright and the consideration was expressed. There may be some where the consideration was an exchange of land or a nominal consideration, which are useless for this purpose.

Mr. POWELL. There is no law requiring the two considerations to be stated, is there?

Mr. LAIRD. Not so far as I am aware, either in the United States or Canada; but the presumption is that the consideration is stated and as you are aware, Commissioner Powell, practically the only way to prove a sale is by the production of the document.

Mr. POWELL. I do not see how the question of the sale bears upon the matter that we are to investigate, unless you are to give us the real consideration.

Mr. LAIRD. It was for that purpose, and the presumption is general that the consideration is stated.

Mr. GLENN. Is that so in this country, that the real consideration is stated?

Mr. LAIRD. I think that is generally the case.

Mr. GLENN. More than one-half of our deeds are for and in consideration of the sum of \$1.

Mr. LAIRD. That has not been my experience. That is all I can say.



Mr. POWELL. Maybe you can summarize the thing. How many deeds have you?

Mr. LAIRD. I have them from one county, that is the county of Beltrami, for two years—1914 and 1915. There are 22 deeds. For 1913 I did not obtain certified copies of the deeds, but there are 13 deeds. That is within a range of 6 or 7 miles around the lake. I did not go farther back. Then, in Roseau County, that is the one in which Warroad is situated—Zippel Bay and that district are in Beltrami County—within those three years there are 74 deeds, and I have made an abstract or memorandum of them showing the dates, the parties, the lands, and the consideration expressed in the deeds, as well as the average price per acre.

Mr. POWELL. That is interesting information for us to have. What is the average price per acre?

Mr. LAIRD. In Roseau County the average price per acre is \$13.69. I may say that I have not selected high or low deeds. I have simply taken them all, and in them are some parcels of land which may be very small in acreage, for instance, 5 acres. I think there are two parcels where the price is \$50 an acre. Then there is also a farm, information concerning which came before the commission at Warroad. I refer to the Honorable Mr. Berg's farm, just adjoining Warroad. The price on that was \$50 an acre. That is the largest price of any farm property that I have discovered. Beltrami County figures out at \$7.83 per acre, but I found that some of the deeds were expressed to be subject to mortgages which were a part of the price, and those mortgages I have allowed for in the price per acre, but I have not made up the average. It would be approximately \$8 per acre. The mortgages amount to only \$300 or \$400. I would like to file these certified copies with the commission. I may say that I have a map of Roseau County here. It is a map that I used in preparing the material.

Mr. POWELL. Are these lands bordering on and in the vicinity of the lake?

Mr. LAIRD. Yes.

(The certified copy of deeds offered in evidence by Mr. Laird was marked "Exhibit No. 7.")

Mr. TAWNEY. What would be the purpose of filing the certified copy of deeds, to verify the statement which you have there?

Mr. LAIRD. Yes, sir; that is all. I suppose that technically the deeds alone could be admitted, but I thought for the purpose of the commission the memorandum would be valuable.

Mr. TAWNEY. You have an abstract there of these various deeds, have you not?

Mr. LAIRD. Yes; I have made this up, Mr. Commissioner. If there is any further information you desire put on it, you may do so. It was simply prepared by myself. As I mentioned, I did not obtain copies of the deeds for 1913. I have here the clerk who made the search, and I would like to call him to verify the search just of those 12 deeds for that one year.

Mr. MIGNAULT. Does this show, Mr. Laird, the situation of the property?

Mr. LAIRD. Oh, yes; it is described there. That is the land is described in the third column.

Mr. MIGNAULT. In the townships?

Mr. LAIRD. Yes, sir. They can be picked out on any map of the county.

Mr. MIGNAULT. Have the representatives of the landowners seen this map?

Mr. LAIRD. No; I intended to show it to Mr. Berkman this morning, but he has not appeared yet, and the memorandum was not complete really until last night.

Mr. MIGNAULT. You understand, of course, it would be proper for Mr. Berkman to see this?

Mr. LAIRD. Yes. There are a number of settlers here, Mr. Landby and Mr. Marschalk, and a number of other parties, and if they can throw any light on it, I am perfectly willing that they should do so. It is simply for the purpose of giving information to the commission that I offer it.

Mr. MIGNAULT. I suppose you are merely fulfilling the promise you made to the commission last fall that you would file these lists?

Mr. LAIRD. That is it exactly; the suggestion was made and we followed it up.

#### TESTIMONY OF MR. HORACE PALETHORPE, OF WINNIPEG, CANADA.

HORACE PALETHORPE, having been duly sworn, testified as follows:

Mr. LAIRD. Mr. Palethorpe, you are a clerk in the employ of my firm, Munson, Allan, Laird & Davis?

Mr. PALETHORPE. I am.

Mr. LAIRD. You made some surveys in the registry office of Beltrami County in the State of Minnesota?

Mr. PALETHORPE. Yes.

Mr. LAIRD. You searched the records for the purpose of ascertaining conveyances of land for the last three years covering property bordering on the lake, I think?

Mr. PALETHORPE. I did.

Mr. LAIRD. And you obtained certified copies of the conveyances for the last two years, 1914 and 1915?

Mr. PALETHORPE. Yes, sir.

Mr. LAIRD. Then, as to 1913, I believe you made a search and took notes of the conveyances?

Mr. PALETHORPE. I did.

Mr. LAIRD. It was subsequently extended in this form?

Mr. PALETHORPE. Yes.

Mr. LAIRD. Do you verify that as a correct abstract of the conveyances for those years affecting those lands?

Mr. PALETHORPE. I do.

Mr. LAIRD. And you have yourself compared, I believe, the memorandum which I produced with the lots described in the certified copy of the deeds and the contents of it.

Mr. PALETHORPE. I have.

Mr. LAIRD. And this abstract you say is a true one?

Mr. PALETHORPE. It is true.

Mr. LAIRD. I will file that with the explanation that the transactions mentioned on page 3 are not supported by certified copies of deeds, but that the others are.



(The paper offered in evidence by Mr. Laird was marked "Exhibit No. 8.")

MR. MIGNAULT. Are you referring to the documents which you have handed to us?

MR. LAIRD. Yes; I will hand in a large bundle of documents, 74 in number, which cover the deeds from Roseau County. This bunch, numbered 1 to 22, are the certified copies of the twenty-two deeds from Beltrami County.

(The papers referred to were marked "Exhibits Nos. 9 and 10," respectively.)

MR. LAIRD. I may say that I obtained from the assessor's office of the county of Beltrami a certificate as to the assessment of the lands in the deeds in Beltrami County. I did that because I thought it might give some information as to the improvements and the value of them. I have that work, although I have not brought it from the office with me, and I could file it with the commission. It shows that practically 50 per cent of the lands in Beltrami County had improvements varying from a few hundred dollars upwards, and the balance had no improvements.

MR. POWELL. What was the average assessed valuation per acre?

MR. LAIRD. I do not think I made that up. I have not similar information from Roseau County, because I had not thought of it at the time the search was made and I have not had time since.

MR. POWELL. As a general thing, though, Mr. Laird, they do not assess the farms in the country districts at anything like value.

MR. TAWNEY. Under the State of Minnesota law they must assess the land at 40 per cent of the actual value. Am I not right, Mr. Hilton?

MR. HILTON. Yes, sir.

MR. TAWNEY. Forty per cent of the actual value is taken as the assessed value; that is, the taxation value is based upon 40 per cent of the actual value of the property.

MR. HILTON. This is a matter that the State as such is not particularly interested in, but I understood that Mr. Berkman would want to offer an objection to this testimony, and, perhaps, submit a little of his own along the line here of the attempt to define the value of those lands. He is, however, engaged down at the hotel, and I presume that he may have an opportunity to do that when he comes.

MR. TAWNEY. Yes, sir.

MR. POWELL. Do you, on his behalf, enter a formal objection?

MR. HILTON. I would if it were necessary, but I understand the commission is very courteous in that way and will allow him to do it when he arrives here.

#### TESTIMONY OF MR. WILSON PHILIPS, OF WINNIPEG, CANADA.

WILSON PHILIPS, being duly sworn, testified as follows:

MR. LAIRD. Mr. Philips, you are in the service of the Winnipeg Electric Railway Co.?

MR. PHILIPS. I am; yes, sir.

MR. LAIRD. What is your present office or position?

MR. PHILIPS. Superintendent.

Mr. LAIRD. You have been connected with the company about 10 years in various positions, I believe.

Mr. PHILIPS. Nearly 12 years; yes, sir.

Mr. LAIRD. I believe your brother, Mr. Wilford Philips, who is the general manager of the company, is not in the city at the present time.

Mr. PHILIPS. No; he is south.

Mr. LAIRD. He is south on leave of absence by reason of ill health, I believe.

Mr. PHILIPS. Yes, sir.

Mr. LAIRD. In the position that the former manager of the company is in California by reason of ill health, I shall have to get the information desired from other officials. I wish, Mr. Philips, you would give the commission information, first, as to the mileage of the street-railway system of the Winnipeg Electric Railway Co. within the corporate limits of the city.

Mr. POWELL. Have you not an abstract of that?

Mr. LAIRD. There was a memorandum supplied to the Dominion Government covering most of this. I do not know whether it is to be put in or not by Mr. Anderson. They asked for this information. We have no memorandum apart from that, although I have asked Mr. Philips to get certain information.

Mr. POWELL. But he has his abstract there.

Mr. PHILIPS. This is what was prepared by the Dominion Government. It is a sort of a brief.

Mr. POWELL. That is practically true to-day?

Mr. PHILIPS. Yes; it is nearly up to date.

Mr. LAIRD. Mr. Anderson is not here. I do not know whether it is his intention to put this in or not. This was prepared for the Dominion Government, and I have no objection to its going in.

Mr. POWELL. You had better put it in, and he can withdraw it if he wants to.

(The paper referred to was marked "Exhibit No. 11.")

Mr. LAIRD. Mr. Philips, referring to this memorandum, I notice the pencil figures for the town of St. Boniface give the population for 1915.

Mr. PHILIPS. Yes, sir; that was gotten from the engineer at St. Boniface.

Mr. LAIRD. Those figures are 12,307.

Mr. PHILIPS. Yes, sir; I put them down myself.

Mr. LAIRD. What is the number of passengers carried during the year 1915?

Mr. PHILIPS. 48,556,927.

Mr. POWELL. What is the capital investment? All we want to get is some idea of the magnitude of the system.

Mr. LAIRD. That is what I am trying to give.

Mr. PHILIPS. In the street-railway lines in the city it is between 8 and 9 million. The distribution system, including the water-power development and transmission lines, is approximately 10 million, making a total for the Winnipeg Electric from 18 to 19 million. The Winnipeg, Selkirk & Lake Winnipeg and the Suburban Rapid Transit are additional.

Mr. LAIRD. You had better explain that. That is, the Winnipeg Electric Railway Co. is not only engaged in operating a street rail



way, but it also supplies electric current for light and power within the city of Winnipeg.

Mr. PHILIPS. Yes; and surrounding districts.

Mr. MIGNAULT. Mr. Laird, would you kindly make that clear to me? I understand that the city itself is engaged in practically the same business, supplying power to consumers, and I would like to have it made clear what part of this work is done by the city and what part is done by private corporations.

Mr. LAIRD. As it is now we are in competition, the city and the company furnishing light and power to the public. Prior to the city's plant going into operation we had the sole business. Please explain that to Commissioner Mignault, Mr. Philips. In what year did the city's plant start supplying light and power to the citizens?

Mr. PHILIPS. In 1911, I think.

Mr. LAIRD. Prior to that who supplied the electric current to the city of Winnipeg as a corporation and to the citizens of the city of Winnipeg and to the district around about?

Mr. PHILIPS. The Winnipeg Electric Railway.

Mr. LAIRD. It was, I believe, the sole corporation or person in that business?

Mr. PHILIPS. Yes; it was.

Mr. LAIRD. And since the city has gone into the hydroelectric business the city has been doing a share of the light and power business?

Mr. PHILIPS. Yes.

Mr. LAIRD. And, of course, the city lights the city streets itself?

Mr. PHILIPS. Yes.

Mr. LAIRD. Prior to the city going into the business, I believe the city corporation, for purposes of lighting streets, for purposes of pumping water and for other municipal purposes, was a very large customer of the company?

Mr. PHILIPS. Yes; it was.

Mr. LAIRD. It was the largest customer, I suppose, that the company had.

Mr. PHILLIPS. Yes.

Mr. POWELL. Mr. Laird, is there any duplication in this? Does this sum of eighteen or nineteen million include the estimate given by the engineer who was here yesterday? There was a gentleman yesterday on the stand giving testimony respecting the development of power on the Winnipeg River, and he gave that amount.

Mr. LAIRD. We have not touched that this morning.

Mr. POWELL. The only point I wanted to make was, does this eighteen or nineteen million include the undertaking we were referring to yesterday?

Mr. LAIRD. That was the city plant. I may say that there was some very general evidence offered at the sittings in Kenora in 1912 as to this company.

Then, Mr. Philips, at the present time the two sources of buying electric current, either for light or power or heating or any other purpose, are the city corporation and your company?

Mr. PHILIPS. Largely. There are places in the city where both systems do not extend. Sparsely settled districts have only one system.

Mr. LAIRD. That is the distribution system?

Mr. PHILIPS. The distribution system has not been extended all over the city by both parties.

Mr. LAIRD. With reference to the distribution systems, I believe the city corporation and the company are working together, as far as they can, in joint distribution? They have one system of poles and matters of that kind?

Mr. PHILIPS. Yes; they have adopted a joint system of poles.

Mr. MIGNAULT. Where does the company as distinguished from the city, Mr. Laird, get its power?

Mr. PHILIPS. I may say that it is on the Winnipeg River at a point farther down known as the Pinawa Channel. The city line covers a distance of about 65 miles.

Mr. LAIRD. Now, Mr. Philips, dealing with this light and power first a little more, within the city limits what are some of the large organizations making use of electric current for power purposes?

Mr. PHILIPS. I think Ogilby's Milling Co. is the largest in the city.

Mr. LAIRD. Do you know, approximately speaking, the capacity of that mill?

Mr. PHILIPS. About 3,000 barrels per day. That information is in the statement I have prepared.

Mr. LAIRD. Then, the company supplies electric light and power, you told us, not only to persons within the city, but in the outlying districts.

Mr. PHILIPS. Yes.

Mr. LAIRD. Will you mention some of those districts?

Mr. PHILIPS. There is the Western Canada Milling Co., in St. Boniface.

Mr. LAIRD. Where does it lie with reference to Winnipeg?

Mr. PHILIPS. It is on the east side of Red River.

Mr. LAIRD. And the Western Canada Milling plant is situated in that city?

Mr. PHILIPS. Yes, sir.

Mr. LAIRD. Do you know its capacity?

Mr. PHILIPS. About 5,000 barrels per day.

Mr. LAIRD. Is the city thickly populated?

Mr. PHILIPS. Yes; it is quite thickly populated for some distance.

Mr. LAIRD. Can you say for how many miles west of the city your system runs?

Mr. PHILIPS. Our lighting system runs out about twelve miles west of the city limits.

Mr. LAIRD. Within those twelve miles you light the streets for the municipalities affected to what extent, all the way out for the distance of twelve miles?

Mr. PHILIPS. All the way out to Headingly.

Mr. LAIRD. Then, in addition to lighting the streets of the municipalities affected, you supply light and power to the citizens who desire them in that district?

Mr. PHILIPS. Yes, sir.

Mr. LAIRD. Do the municipalities use power for any public purpose that you know of? Take the municipality of Assiniboine.

Mr. PHILIPS. No.

Mr. LAIRD. They have not any pumping system?

Mr. PHILIPS. No.



Mr. LAIRD. Then on the southern boundary of the city of Winnipeg the same thing applies as to the distribution of light and power for the use of the public?

Mr. PHILIPS. Yes; the municipality of Fort Garry.

Mr. LAIRD. That lies to the south?

Mr. PHILIPS. Yes, sir.

Mr. LAIRD. And the company supplies light and power to the citizens in that municipality?

Mr. PHILIPS. Yes. We have a large manufacturing industry there, the Canada Cement Co.

Mr. LAIRD. It is situated beyond the city limits, beyond this municipality of Fort Garry. Do you know the amount of power you supply to the Canada Cement Co. at that point?

Mr. PHILIPS. About 4,000 horsepower.

Mr. LAIRD. That has been in operation for how many years?

Mr. PHILIPS. About three years; but not to that extent. There was a less quantity of power required the first year, but last year they got the full capacity.

Mr. LAIRD. In the municipality of Fort Garry the municipality lights the streets and the highways with electric current, I suppose, from your company?

Mr. PHILIPS. No; they have no system of street lighting yet. It was only last year that we extended our lighting system in that municipality.

Mr. LAIRD. The Manitoba government, I believe, has built a large agricultural college within that municipality.

Mr. PHILIPS. Yes.

Mr. LAIRD. Does your company supply electric current to it?

Mr. PHILIPS. Yes.

Mr. LAIRD. For lighting and power purposes, I believe?

Mr. PHILIPS. For both; yes.

Mr. LAIRD. Then take the section to the north of the city; first, east of the Red River; your company supplies light and power to the citizens along the east side of the river lying north of the city limits, I believe?

Mr. PHILIPS. In Kildonan; yes.

Mr. LAIRD. Then on the west side of the Red River, the Selkirk Co. operates?

Mr. PHILIPS. Yes, sir.

Mr. POWELL. Mr. Laird, the object of going into this is to give us some idea, first, as to the absolute importance of the power interests here, and, secondly, to ascertain its relative importance to serve in comparison with other interests. It would not interest us one particle to know whether the development takes place at St. Boniface or here. All we want to know is the magnitude of the interests involved. If you can put that information in a statement and hand it in it would save a lot of time. The witness could swear to the correctness of it.

Mr. LAIRD. This statement that has been put in is fairly complete, but there were some details that were not prepared by me.

Mr. POWELL. All we want is a summary. Your strong point is this: Your client is dealing with a big interest, say, from a monetary standpoint, to the value of forty or fifty million dollars, and due consideration should be given to that in comparison with smaller affairs.

But that is the whole case you are making, and I do not see any sense in going into these details.

Mr. LAIRD. Well, a certain amount of detail is necessary.

Mr. POWELL. Yes; you can not make up a total without giving the constituent elements, but let the engineer do that and give us the totals.

Mr. LAIRD. I think we can leave the question of the distribution of light and power. It is simply throughout this district. I think the statement contains Mr. Philips' figures as to the amount of electric current used for light and power.

Mr. PHILIPS. Yes, sir.

Mr. LAIRD. What are those figures?

Mr. PHILIPS. The total output at our water power station in 1914 was 120,000,000 kilowatt hours. In 1915 it was 110,000,000 kilowatt hours.

Mr. LAIRD. What part of that is used for light and power, can you tell me?

Mr. PHILIPS. The power in 1915 was 46,000,000 kilowatt hours and 14,000,000 for light, making a total of 60,000,000.

Mr. LAIRD. That was supplied within the corporation of the city and without any of these outlying municipalities?

Mr. PHILIPS. No; that included the light and power for the city and the municipalities.

Mr. LAIRD. I wish you would explain very briefly the location of these suburban lines. What we call the Winnipeg Electric Railway Co. operates the system of street railway lines within the city?

Mr. PHILIPS. Yes; and St. Boniface and Fort Garry.

Mr. LAIRD. And in the municipalities on the east side of the Red River lying north, I believe?

Mr. PHILIPS. The Winnipeg Electric; yes, sir.

Mr. LAIRD. Have you a map there that you could give to the commission?

Mr. PHILIPS. Yes. It is not to scale, but it shows the location of the different lines.

Mr. LAIRD. And this diagram explains the colors, does it?

Mr. PHILIPS. Yes.

(The map referred to was marked "Exhibit No. 12.")

Mr. LAIRD. The situation, then, is this: The city company operates within the city and also a part of the suburban lines, and then there are two other suburban companies? The Suburban Rapid Transit Co. has lines of street railway where?

Mr. PHILIPS. Running west from the city, north and south of the Assiniboine River.

Mr. LAIRD. Now, taking the line on the north side of the Assiniboine River, how far west of the city limits does it run?

Mr. PHILIPS. It runs out 12 miles.

Mr. LAIRD. The line on the south side of the river?

Mr. PHILIPS. Between 6 and 7 miles.

Mr. LAIRD. Do you know the number of passengers the Suburban Rapid Transit Co. carried during 1915?

Mr. PHILIPS. In 1915 it carried 917,405.

Mr. LAIRD. What about the future extension or development of those lines? Are there requests coming to the company for the extension of those lines?



Mr. PHILIPS. Oh, yes.

Mr. LAIRD. On both sides of the river?

Mr. PHILIPS. We were very hard pressed on both sides of the river previous to the financial depression. Since then there has not been anything.

Mr. LAIRD. And the line on the north side of the river serves the community known as St. James, which you have referred to, and which is closely settled for some distance beyond the city?

Mr. PHILIPS. Yes.

Mr. LAIRD. Then the line serving the suburbs lying north of the city is the Winnipeg, Selkirk & Lake Winnipeg Railway Co., I believe?

Mr. PHILIPS. Yes.

Mr. LAIRD. The line to Selkirk is on the west side of Red River, I believe?

Mr. PHILIPS. Yes, sir.

Mr. LAIRD. What is the distance?

Mr. PHILIPS. Twenty miles.

Mr. LAIRD. Then from that line there is a branch running to the town of Stonewall, I believe?

Mr. PHILIPS. Yes.

Mr. LAIRD. What is the length of that branch?

Mr. PHILIPS. It is 17 miles additional. It uses a portion of the Selkirk line to Middlechurch, about 6 miles.

Mr. LAIRD. Then, are there any requests to the company for an extension of those lines beyond those points?

Mr. PHILIPS. Yes. At Stonewall they are very anxious for it to go farther north to Gunton and Balmoral.

Mr. LAIRD. Has the company made any canvass or investigation of the situation as to the supply of electric power in that district?

Mr. PHILIPS. It has.

Mr. LAIRD. Beyond Stonewall and Selkirk what is the situation?

Mr. PHILIPS. Beyond Stonewall there is one of the best farming districts in Manitoba in dairying products and other products for the city.

Mr. LAIRD. What do you find as to the result of the canvass that was made? Is there a future prospect for the supply of electricity?

Mr. PHILIPS. Yes; the company is inclined to extend the line when financial conditions warrant it.

Mr. LAIRD. I believe you are supplying light and power to people along the line as far as it does extend?

Mr. PHILIPS. Yes; lighting the town of Stonewall and the streets of Stonewall, and supplying current to the town of Selkirk for the same purpose, only they do their own distribution.

Mr. LAIRD. Then, Mr. Philips, a few words as to the source of this power. For the operation of these street railway lines and for the supply of electric current for these various purposes where does the company get its power?

Mr. PHILIPS. From three sources. It has a water-power plant on the Pinawa Channel of the Winnipeg River and two steam plants in the city.

Mr. LAIRD. As to the water-power plant in the Pinawa Channel, it is situated on the Winnipeg River about 190 miles, I believe, below its outlet in the Lake of the Woods?

Mr. PHILIPS. Yes.

Mr. LAIRD. It is how far from Winnipeg?

Mr. PHILIPS. About 65 miles.

Mr. LAIRD. I do not think, Mr. Chairman, there is anything in the record or in the engineers' reports as to the capacity of that plant or its development or how long it has been in use. I think that probably that had better be explained.

Mr. MAGRATH. Go ahead.

Mr. LAIRD. I do not wish to go into details. If the commission or the engineers wish any details, we would be glad to give them. As to the plant, I believe it was completed in 1906.

Mr. PHILIPS. In June, 1906.

Mr. LAIRD. And it has been in operation since that time?

Mr. PHILIPS. Yes, sir.

Mr. LAIRD. What is the capacity of the plant?

Mr. PHILIPS. About 30,650 horsepower.

Mr. LAIRD. Then can you describe briefly the machinery that is installed?

Mr. PHILIPS. There are nine water wheels attached to the same number of generators.

Mr. TAWNEY. What is the total capacity of the nine wheels?

Mr. PHILIPS. 30,600 horsepower.

Mr. LAIRD. After the power is developed there it is transmitted to the city over this transmission line extending 65 miles?

Mr. PHILIPS. Yes, sir.

Mr. LAIRD. Will you describe briefly the transmission line?

Mr. PHILIPS. The current is generated at 2,200 volts and stepped up to 5,000. The capacity of the transformers has a ratio up to 60,000, but it is now being used at 50,000 volts. At this end it is stepped down to the 2,200 again and also to the 22,000. We use both voltages in our distribution system.

Mr. LAIRD. Then in the city of Winnipeg, when the power is brought into the city, you have what is known as a substation, I believe?

Mr. PHILIPS. Yes, sir.

Mr. LAIRD. What is the purpose of that?

Mr. PHILIPS. That is for transforming the current and distributing it and the generation of direct current for the railway.

Mr. LAIRD. The railway is operated by direct current?

Mr. PHILIPS. Yes, sir.

Mr. LAIRD. And most of the light and power use the indirect?

Mr. PHILIPS. That is, alternating; yes.

Mr. LAIRD. You have some power consumers using the direct current, have you not?

Mr. PHILIPS. Yes; just for elevator purposes largely, small motors.

Mr. LAIRD. Then, in addition to this main substation in the city, the company has, I believe, throughout the city a number of other substations?

Mr. PHILIPS. Yes.

Mr. LAIRD. That is, you carry the electricity to those in larger voltage and transform it there again?

Mr. PHILIPS. No; it is for street railway purposes in the city. But we have transformer stations outside of the city. We have one at the Agricultural College.



Mr. LAIRD. How many transformer stations are there in the city?

Mr. PHILIPS. There are two at Fort Garry, one at the Agricultural College, and one at the Canada Cement Co.

Mr. LAIRD. How many are there in the city?

Mr. PHILIPS. There are five substations in the city for generating direct current. Then we have a step-down transformer station at Transcona and a step-up transformer station just north of the city to supply current for the Winnipeg, Selkirk & Lake Winnipeg Railway.

Mr. LAIRD. Then you have referred to two steam plants in the city. Prior to 1906, how did the company operate its system of street railways and carry on its electric light and power business?

Mr. PHILIPS. By steam.

Mr. LAIRD. And one of the steam plants is that same steam plant which has been kept in repair and not destroyed?

Mr. PHILIPS. Yes.

Mr. LAIRD. Can you tell me the capacity of it?

Mr. PHILIPS. 6,000 horsepower.

Mr. LAIRD. What is the capacity of the second steam plant?

Mr. PHILIPS. That is 16,000 horsepower.

Mr. LAIRD. When was it built?

Mr. PHILIPS. In 1911.

Mr. LAIRD. Can you tell me, approximately, the cost of the construction of it?

Mr. PHILIPS. Exclusive of land, about three-fourths of a million.

Mr. LAIRD. Exclusive of the site, about three-quarters of a million?

Mr. PHILIPS. Yes, sir.

Mr. LAIRD. What was the purpose of that second steam plant that was built at that time?

Mr. PHILIPS. Principally a stand-by. At that time it was practically a stand-by. Since then we have used it also as a peak load plant.

Mr. LAIRD. Is the supply of electricity which you obtained from the Pinawa plant sufficient for the purpose of the company?

Mr. PHILIPS. It is not.

Mr. LAIRD. And you use these steam plants for the purpose of making up the deficiency, I believe?

Mr. PHILIPS. Yes, sir.

Mr. LAIRD. Can you tell us, approximately, the requirements in that respect, the calls upon the steam plants?

Mr. PHILIPS. During the winter months we have gone up to 12,000 kilowatts on the steam plant.

Mr. LAIRD. I suppose there are particular times of the day that the steam plant—

Mr. PHILIPS. Yes; what we call the peak load hours.

Mr. LAIRD. When are those?

Mr. PHILIPS. In the mornings and evenings.

Mr. LAIRD. That is due to what?

Mr. PHILIPS. It is due to the overlapping of the lighting and railway peak during the hours that the power consumers are still using power.

Mr. LAIRD. Do you know whether it is possible to develop any more hydroelectric power at the Pinawa plant?

Mr. PHILIPS. I believe it would be, but it will be expensive.

Mr. LAIRD. Would it be too expensive to justify the expenditure?

Mr. PHILIPS. Yes, sir.

Mr. LAIRD. During 1914 what percentage of the time was the steam plant called into operation by reason of deficiency in the hydroelectric power?

Mr. PHILIPS. I have not any data on that, but I know it was operated practically every day during the low temperature weather of the winter months.

Mr. LAIRD. Would the same apply to 1915?

Mr. PHILIPS. The same would apply. The only other time it would be operated would be in the case of line troubles or some breakdown in the water power.

Mr. LAIRD. Occasionally you have difficulty with the lines by reason of storms or winds or something of that kind.

Mr. PHILIPS. We have had a few times.

Mr. LAIRD. But on the whole, what would you say as to the operation of the hydroelectric plant for the entire 65 miles?

Mr. PHILIPS. There are very few interruptions in this country.

Mr. LAIRD. I think that is all I have to ask. If there is any further information that is not contained in that memorandum I might wish to supplement it later.

Mr. ANDERSON. Mr. Philips, do you get all the water that you require at the Pinawa Channel now without drawing on the storage in the Lake of the Woods?

Mr. PHILIPS. No; we have asked for that every winter, especially this year. If I remember rightly, it was about the middle of November when we asked for it.

Mr. ANDERSON. For how many winters have you been asking for and getting some additional water from the storage in the Lake of the Woods?

Mr. PHILIPS. I can not just say how many, but for several winters.

Mr. ANDERSON. You say that this winter particularly you were relying upon that storage?

Mr. PHILIPS. Yes.

Mr. ANDERSON. If it were not for that storage in the Lake of the Woods what would your position be at Pinawa?

Mr. PHILIPS. We would not be able to develop as much power there as we are developing.

Mr. ANDERSON. Well, would it possibly mean a much shorter operation of your plant there in the wintertime?

Mr. PHILIPS. It would mean that we would operate that much more by steam.

Mr. WYVELL. Mr. Philips, are you an engineer?

Mr. PHILIPS. Yes.

Mr. WYVELL. Your plant is located below the point where the English River meets the Winnipeg River?

Mr. PHILIPS. Yes.

Mr. WYVELL. The thing that your plant most needs in order to secure the highest efficiency in the use of the water is a uniform flow, is it not?

Mr. PHILIPS. Yes.

Mr. WYVELL. If it secures a uniform flow it is immaterial, so far as the efficiency in the use of your plant is concerned, whether the Lake of the Woods has a high level or a low level, is it not?



Mr. PHILIPS. Yes; as long as we get a sufficient quantity of water.

Mr. WYVELL. In other words, you are more interested in the possibilities for storage in the Lake of the Woods than you are in the maintenance of any particular level there?

Mr. PHILIPS. Yes.

Mr. POWELL. But you use more power in the wintertime than in the summer time?

Mr. PHILIPS. Yes, sir; we use more power, and our capacity for water power decreases in the winter.

Mr. MEYER. Can you give us any information as to the difference between the cost of operating your steam plant and the cost of operating your water-power plant, and not considering therein the fixed charges?

Mr. PHILIPS. I can not, for the reason that the steam plant is used for the two purposes. The stand-by expense and the operating expense are so compiled together that you can not separate them. Just what the operating charges per kilowatt-hour would be if we were operating steadily we do not know.

Mr. GLENN. As a general rule, which is cheaper and how much cheaper is one than the other?

Mr. PHILIPS. The water power is much cheaper.

Mr. GLENN. Can you give us any estimate as to how much cheaper it is?

Mr. PHILIPS. No; I can not.

Mr. POWELL. Taking all charges, fixed charges, and capital invested, and everything else, what would you say your Winnipeg cost per horsepower per annum is, taking it for 12 hours?

Mr. PHILIPS. Do you mean the water-power development?

Mr. POWELL. No; the horsepower in your steam.

Mr. PHILIPS. I could not tell you, because the steam plant stands still probably seven or eight months of the year and would not run in that time for probably a week.

Mr. POWELL. But drawing a conclusion from the time that it does run?

Mr. PHILIPS. The idea is that during that time it is manned and steam is up. Now, that adds to the cost of the operation.

Mr. POWELL. But as an engineer you must have some idea of it?

Mr. PHILIPS. I am afraid that any information I would give along that line would be misleading.

Mr. POWELL. Well, can you not give an idea within certain limits? Does it cost \$70 or \$100 per annum per horsepower, or what?

Mr. PHILIPS. I have not it figured out on that basis, but I have, of course, an idea within a broad range of what it would cost per kilowatt-hour to turn it out. I have tried to get it several times, but have never been able to get it. I have gotten it all the way from 1 cent to 4 cents per kilowatt-hour.

Mr. MEYER. That is the total cost?

Mr. PHILIPS. That is the operating cost, exclusive of overhead charges?

Mr. POWELL. You can not give us any idea on that score?

Mr. PHILIPS. It would be impossible to give you any idea.

Mr. WYVELL. Mr. Philips, what head do you utilize at your plant?

Mr. PHILIPS. From 35 to 41. I think the average is about 39.

Mr. WYVELL. How many cubic feet per second do you utilize on an average, if you know?

Mr. PHILIPS. I have not got that. I can get it for you.

Mr. WYVELL. Will you supply that later?

Mr. PHILIPS. Yes.

Mr. WYVELL. During the time when you need the greatest power—that is, during the wintertime—I would like to know how many cubic feet per second you use. Will you also supply that information?

Mr. PHILIPS. I will.

Mr. MEYER. Does your company keep continuous records of the head-water level and the tail-water level where your gauges are installed?

Mr. PHILIPS. Yes.

Mr. MEYER. Can you also supply that information?

Mr. PHILIPS. I can get that; yes.

Mr. LAIRD. I intended to call the superintendent of the company. He has gone.

Mr. MAGRATH. Before we proceed, I would like to make a statement for the benefit of Mr. Berkman in reference to the drainage question that was up yesterday afternoon, as to what I think is a misapprehension in his mind regarding the viewpoint of some of the members of the commission when we were at Warroad last fall. I am quite ready to confess that probably I failed to make myself clear. I might put it in this way: Mr. Berkman, you would probably hold that in the control of the outlets of the Lake of the Woods no consideration has been given to the agricultural interests of the south side; you would probably hold that in that control there might have been some consideration given, and it appears that that same principle can equally be applied to the ditching systems at the south shore of the Lake of the Woods. There has been a good deal of testimony offered by engineers, but there has been no clear statement made as to the territory that it is proposed to drain into the Lake of the Woods. There has been no evidence offered as to the amount of water that would probably be carried from that area into the Lake of the Woods and the amount that might be discharged through the run-off in, say the first month after the spring opens up.

There has been no clear statement as to the development of the ditch system in that territory, as to whether there was a very comprehensive survey made of the whole area, and that these judicial ditches, county ditches, and the State ditches are units of a great system of ditches; and what was in mind when we were at Warroad was as to whether these ditches have been surveyed from the interior down to the lake, or whether the systems have been surveyed from the lake back into the interior, because I can very well understand that if you carry ditches from the interior and throw away grade in order to get down to the lake in the shortest possible distance, that low-lying lands tributary to the lake may in consequence suffer; whereas, on the other hand, if you develop your system from these low-lying lands at the lake shore, greater provision can be made for the protection of those lands in the carriage of the water from the interior. That is what was in my mind when the matter was up at Warroad last year. If the ditches have been located far from the lake (into the interior) I would naturally think that some lake level



would be established for ditch outlets. I thought I would mention it now, while you have these gentlemen from there, and Mr. Dent very kindly offered to give Mr. Meyer the fullest information. I want to mention it so that Mr. Meyer could have it in mind when he is going into the matter with Mr. Dent.

Mr. BERKMAN. As we indicated in our hypothetical question to Mr. Meyer yesterday, the drainage is started from the interior by petitions, and the petitioners do not take into consideration the fellows lower down that may be damaged.

Mr. MAGRATH. Our interest is largely in those lower lands.

Mr. BERKMAN. I understand that. Now, in regard to the amount of water that will fall in any given time, I imagine it can be computed by knowing the area. As to the area that will be drained into the Lake of the Woods, it can be readily ascertained from what is called the International Joint Commission map of the watershed of the Lake of the Woods, and I think the engineers for the commission can compute from the area of the watershed; because all that watershed, while it is not, to date, in progress of drainage, within a very few years will be drained with ditches in the development of the country; so that you can figure on the whole watershed being drained, and from that the engineers can compute, I take it—

Mr. MEYER. It is about 2,500 square miles on the United States side?

Mr. BERKMAN. Yes.

Mr. MIGNAULT. I suppose, as a consequence of that system of drainage, the low-lying lands in the immediate vicinity of the lake will be subject to some flooding which will result from the drainage system.

Mr. BERKMAN. In answer to that, Mr. Willard, I think, spoke of these lands and this vegetable soil or mould that lies south of the Lake of the Woods. Now, there is some of that land that will hold from eight to nine times its own weight in water, and when these lands are drained the water will run off and will be dried out by the time we get our rains, and then they will act as a reservoir again and hold the water, and let it off again gradually, and it will run out gradually; and I think, especially as far as this part of the drainage in Minnesota is concerned, that it acts more as a reservoir than in any other instance in the States, because of the porous land. It is the vegetable mould upon this land, and lots of it will take up two times its weight in water.

Mr. POWELL. As I understand you, in answer to Mr. Magrath, you said with reference to this system of drainage, that the policy pursued has rather been one of drift than in pursuance of a broad comprehensive scheme.

Mr. BERKMAN. It is a policy—I don't know that I would put it that way—

Mr. POWELL. Or there has been a lack of policy.

Mr. TAWNEY. There is no general policy or general system, but is this not the fact; that the ditches are initiated by individual citizens?

Mr. BERKMAN. Now that we have entered into that, I will state that the Government of the United States made a survey of all the lands in the Chippewa Reservation, and that the landowners there were assessed 3 cents an acre to make this survey—the United States Geological Survey. That survey was made for the purpose of draining these lands.

Mr. TAWNEY. That is, the lands in the Red Lake Reservation?

Mr. BERKMAN. Yes; and practically all the lands we have had in our ditch construction have been in this reservation, and the United States Government was going to pursue the same policy it has pursued in the reclamation of desert lands, and do it under a uniform policy, but some of the interests were not satisfied with the drainage of that country. It was some few years since, and if the land owners could go in and homestead, their lands would be drained. They could hold the lands and could live there, and these interests could not purchase these lands or the timber on them, and for that reason these interests had petitions circulated, and it was done quietly; people did not get next to the proposition until the matter had gone into the Department of the Interior, and the drainage by the United States Government was called off, and it was done quietly, and for that reason these lands have not been drained under that uniform policy, under which it might have been otherwise drained.

Mr. POWELL. It has been by piecemeal, in compliance with the application of the owners.

Mr. BERKMAN. Since these companies and these other interests have been creating what is termed a political atmosphere before the commission, with the purpose of stopping the drainage by the policy of the United States Government, that they might purchase their lands at their own prices, and that the homesteaders would be practically under their control—

Mr. POWELL. It is the fact I am after; it is not the underlying philosophy of the thing.

Mr. BERKMAN. We are not responsible for the drainage system. Here is the proposition: Lots of these lands are Government lands, and they lay on table-land—

Mr. POWELL. You misunderstand the object.

Mr. BERKMAN. Let me continue. These lands are lands that are called swamps, or, as the Indian calls it, muskeg, and the result is that when we refer to these lands as muskegs it is derived from the Indian word muskeg, meaning swamp; and in the introduction of exhibit number 7, looking over that I find that a good many of these lands have been taken under the Volstead Act. The United States Government lands are assessed for taxes. The Government does not pay the taxes, and the purchaser of the delinquent tax certificate, by taking that to the United States land office and presenting it with his application to file, the tax certificate stands in lieu of cultivation, residence, and all other things required by the United States Government to acquire title to the lands under the homestead act, which would be a residence of five years in order to acquire title.

Mr. TAWNEY. That drainage system under the Volstead Act is in conjunction with the State laws?

Mr. BERKMAN. Yes it is, practically.

Mr. TAWNEY. It is intended to dovetail in with our State law?

Mr. POWELL. It is the dovetailing in with the general operation of the general scheme that I am after. There has been no general scheme in view with respect to which the ditching and draining has been carried on.

Mr. BERKMAN. It only develops so far as the country settles up. It is a process in development.

Mr. KEEFER. It is the only way to get the land sold if the taxes are not paid.



Mr. BERKMAN. I object to receiving any evidence of Exhibit 7, purporting to be a list of conveyances of lands in Beltrami and Roseau Counties in Minnesota, on the ground that the same is irrelevant, incompetent, and immaterial, and the commission knows that the price named in the deed of conveyance is neither evidence of the sale price nor is it evidence of the value, and that much of this land appears to be land that is taken under the Volstead Act, and I might say there are many people who barter their homestead rights. They have a homestead right; no one takes more than 160 acres under the Volstead Act, and he must have a homestead right in order to take it; and many of them justify the homestead and turn it right over and sell it, and pick up what little money they can from it.

Mr. POWELL. Your objection would rather go to the weight of the evidence than to its admissibility.

Mr. BERKMAN. I do not know that it is admissible.

Mr. MIGNAULT. It is probably admissible for what it is worth.

Mr. BERKMAN. Probably.

Mr. GLENN. It is some evidence, but inconclusive evidence.

Mr. BERKMAN. I understood the power companies, before the War-road hearing, had men out for some two weeks gathering up evidence, and they did not at that time see fit to put in any, and, for that reason, it might still be objected to.

Mr. POWELL. To avoid going back to the question of drainage, there is a matter I would like to see cleared up. I do not know what my brother commissioners think about it, but it strikes me that the question to which I refer is left in somewhat of a chaotic condition, and that is the question of the effect of a newer drainage system, of an increase in the height of the water of the lake. It is left in a very hazy condition. If my brother commissioners agree, I would like to call the two engineers from the State of Minnesota and have this thing cleared up, because it may be a tremendously important matter, and it may not be nearly as important as it would strike one at first blush.

Mr. BERKMAN. How would it be if you would put Mr. Meyer on the stand and have him tell us?

Mr. POWELL. I would prefer the men who are right on the ground and know about it.

Mr. BERKMAN. He testified he was not acquainted with the ground yesterday.

Mr. POWELL. As I understand, Mr. Willard is in charge of the system generally.

Mr. BERKMAN. No; he is only in charge of State systems, and he has no supervision and nothing whatever to do with the drainage that drains directly into the Lake of the Woods.

Mr. POWELL. Who has? Dent?

Mr. BERKMAN. Dent has charge.

#### TESTIMONY OF MR. E. V. WILLARD—Recalled.

Mr. E. V. WILLARD, having been previously sworn, was recalled and testified as follows:

Mr. POWELL. I am troubled about a certain matter. I have my own ideas about it, but I want it clearly brought out what the view

of your department is, if there is any view, as to the effect upon the drainage system of an increase in the level of the lake; does that have any effect upon the drainage system generally?

Mr. WILLARD. You refer to the Lake of the Woods?

Mr. POWELL. Yes.

Mr. WILLARD. That question appears rather confusing to me, because I have not made any examination of the topography of the land lying around the Lake of the Woods, and therefore I am not in a position to state what specific effect the raising or lowering of the water of the lake may have on some specific drainage project.

Mr. POWELL. Eliminate specific instances and take general cases, and I will be specific only in respect of the increase in the height of the lake. Supposing the level of the lake is increased in height from 1,057 to 1,060, what would be the effect, in general terms, upon the general system of drainage?

Mr. WILLARD. If the territory immediately adjacent to the shores of the Lake of the Woods is swamp—that is, ground that does not range more than 4 or 5 feet above the original level of the lake, and extending back 4 or 5 miles from the lake—I would say the raising of the lake 3 feet would be disastrous to the drainage of that swamp land.

Mr. POWELL. When you come to the land higher, back of it, how would it be?

Mr. WILLARD. If the land back of this swamp has a fall of 3 feet or more per mile, I would say it would not materially affect the drainage of the land back of it, only it would decrease the sum total of the number of feet fall in the project, but aside from that it would not affect it materially.

Mr. POWELL. Then its effect would be confined to the marginal low lands?

Mr. WILLARD. Yes. Of course my testimony is given in a general way without knowing anything of the conditions.

Mr. POWELL. Certainly. Particular localities may require qualifications. Now I will go a little further. If the level of the lake were raised from 1,057 to 1,060—and I am simply taking these as illustrations—would the effect be this: simply, that you would be transferring the condition of affairs at the low margin of the lake to a similar condition of increase at the margin of the lake at the higher level?

Mr. WILLARD. I would say not. It would not be identical. The original basin which contains the lake through wave action and through the fact that it has been exposed to water from time to time has rendered this basin practically impervious, and it receives and keeps its water under natural conditions; if the elevation of the lake is raised so as to bring the waters beyond this line that has been occupied by the water under natural conditions I would say this new shore line, which is by this change made to serve as the boundary of the lake, is not in a condition to hold the water or to serve as a basin in the same sense as the original basin.

Mr. TAWNEY. In other words, the seepage would be greater?

Mr. WILLARD. Yes.

Mr. POWELL. Now, so far as we are concerned, in arriving at conclusions the matter would be one purely and simply of valuation of the marginal lands injured, would it not?



Mr. WILLARD. Marginal lands directly injured, together with whatever damage might be incurred on other lands, because of their diminished opportunity for drainage that might be brought about by the raising of the level of the lake.

Mr. POWELL. But it would not affect or impair the general efficiency of the drainage system?

Mr. WILLARD. Not back from the lake on the higher elevation.

Mr. POWELL. And the matter for our consideration would be confined to the lowlands along the margin of the lake?

Mr. WILLARD. Yes; the lands along the margin of the lake that are being flooded and those that are damaged because of the fact that they can not be so readily drained.

Mr. POWELL. Now I come to another point, the difficulty that has been referred to in connection with the increase of the level, and the effect on the drainage of the detritus or the silt that is brought down by the drains. Now this silt would have to be taken care of at the margin of the lake, practically, whether the lake stood at 1,057 or 1,060, would it not?

Mr. WILLARD. I can see no reason why now that would not be correct, so far as I can see.

Mr. TAWNEY. You mean the silt would choke the outlet whether at 1,057 or 1,060?

Mr. WILLARD. Yes.

Mr. POWELL. Whether the lake stood at 1,057 or 1,060?

Mr. WILLARD. Certainly.

Mr. POWELL. There might be some local differences; there might be more of a drop at 1,057, which would affect the question?

Mr. WILLARD. Yes.

Mr. POWELL. But I am speaking generally. Now that silt, without regard to the level of the lake at all, would have an effect when it debouched from the drain, of building up a territory there, would it not?

Mr. WILLARD. It would have a tendency to make a delta at the outlet.

Mr. POWELL. It would be much the same condition as is presented on big rivers, where the detritus, or alluvial deposits, form bars at the mouth of the stream?

Mr. WILLARD. I would say so.

Mr. POWELL. And that would have to be removed to make the drainage system an effective one?

Mr. WILLARD. Yes.

Mr. POWELL. Now, coming to another matter; there are two ways of disposing of the silt; one is, to use an Irish phrase, by not having silt at all, and the other by disposing of it after you get it. When I say by not having silt at all, that is by having the bed of your drain so fixed with drops that there would be practically no silt coming down stream; that is one way?

Mr. WILLARD. Yes.

Mr. POWELL. But if the silt is allowed to come down the stream, it must be artificially disposed of at the mouth of the ditch, in order to make your drainage system effective?

Mr. WILLARD. Yes. If the conditions are such that the mouth of the ditch will be filled because of the silt, this silt must be removed by some artificial mechanical means.

Mr. ROCKWOOD. Do you bear in mind the fact, which appears in evidence, that the level of the Lake of the Woods, 25 or 30 years ago, was artificially raised?

Mr. WILLARD. No; I do not bear any of those facts in mind. My connections with the International Joint Commission have been confined to these hearings, and I have not given the subject any study from an engineering point of view as to the conditions that have prevailed or are prevailing.

Mr. ROCKWOOD. Supposing it does appear that did take place, and that the water has been raised two or three feet above the former level, has not the water already gone out of that natural impervious bed, or comparatively impervious bed, of which you speak, and passed into a place where the silt is greater, and has it not been there for some time?

Mr. WILLARD. On your assumption; yes.

Mr. MIGNAULT. In consequence of the extension of your drainage system along the marginal lands along the Lake of the Woods, it is exposed to be flooded by the water coming down the drains from the upper country some distance back of the lake?

Mr. WILLARD. As a rule, the engineer takes into consideration, or should take into consideration, the conditions prevailing. If there is a precipitous fall from the inland waters of the lake, and that fall is suddenly reduced as the ditch approaches the outlet into the lake, he should take care of this sluggishness in the gradient by increasing the size and capacity of the ditch, so as to be able to take care of the water. That is a problem that is purely an engineering problem, and should be taken care of in designing the plans.

Mr. MIGNAULT. Of course silt would have to be removed, otherwise the waters would be spread over the neighboring lands?

Mr. WILLARD. If there was sufficient silt to fill up the ditch, it would have to be removed.

Mr. BERKMAN. For instance, in the Lake of the Woods, where the land, for a mile or two, is 1,059, and the water is up about that stage, if there was quite a little silt it would fill up the ditch the whole mile, would it not?

Mr. WILLARD. Will you repeat that?

Mr. BERKMAN. Take, for instance, in the Lake of the Woods, where the land was at a stage of 1,059—

Mr. WILLARD. As compared with what elevation in the lake?

Mr. BERKMAN. One thousand and fifty-nine, and it continues for that distance about a mile from the lake, until you strike higher land, with a stage of water of 1,059, the silt would fill up the whole ditch.

Mr. WILLARD. It is on the assumption the ditch was dug to a deeper depth than 1,059?

Mr. BERKMAN. Yes.

Mr. WILLARD. Well, the ditch would be absolutely ineffective. If the elevation of the water was equal to the elevation of the land, and there would be no fall, the silting would begin as soon as the ditch discharges into that elevation and would continue to silt.

Mr. BERKMAN. And would fill the entire mile?

Mr. WILLARD. Yes.

Mr. BERKMAN. And is it not a fact that it would continue to fill up the ditch a little way above that, when the water comes down about that level, that it would continue to silt above the water line?



Mr. WILLARD. I think it is true that any artificial grades that can be established in a ditch tend to adjust themselves to the grades commended by nature in the discharge of the waters.

Mr. BERKMAN. If from the water line at 1,059 the grade of the land should be away from the lake, say 3 feet per mile; that is, continuing away from the lake; how far up the ditch—a 5-foot ditch or a 4-foot ditch—would it continue to silt back and fill up the ditch?

Mr. WILLARD. It is such a purely hypothetical question that I do not know that I am qualified to state that.

Mr. BERKMAN. I am going to read a paragraph from an article on the "Care and cultivation of muck farms"—

Mr. MIGNAULT. Speaking for myself, my view would be this: That assuming the slope of the land bordering on the lake is uniform, it is entirely immaterial for your drainage system whether your lake level be at 1,057 or 1,060, or any other elevation. The effect which would result at 1,057 will necessarily result at 1,060, if the slope be uniform. I would ask Mr. Meyer if I am not right?

Mr. MEYER. That would be my view.

Mr. BERKMAN. I will read from an article headed "The care and cultivation of muck farms," by Paul H. Todd, Kalamazoo, Mich., reprinted from the Journal of the American Peat Society, volume 9, page 1:

Tile draining on muck land appears to be very beneficial, but as the expense is considerable, it is usually placed at first only in the ground that is especially cold and wet. The usual method is to lay 4-inch common drain tile in parallel lines about 5 or 6 rods apart, at a depth of 3 or 4 feet below the surface.

Now, then, in regard to lands that lie immediately above the water service, what effect would it have? Can these lands that lie directly above the water surface be drained under the tile system?

Mr. WILLARD. No.

Mr. BERKMAN. That is if they extend back at a slope of, say, 3 feet to the mile?

Mr. WILLARD. I think engineers will state that the outlets for tiles should be 4 feet deep, or deeper, to make a tile drain successful.

Mr. BERKMAN. And how much of a fall should it have to be successful?

Mr. WILLARD. I have known tile to be laid perfectly on the level when there is no fall to be had, but that is not desirable.

Mr. BERKMAN. What is the most desirable fall?

Mr. WILLARD. I would say tile can have any fall; it never gets too much, because there is no erosion takes place.

Mr. BERKMAN. What is the minimum fall?

Mr. WILLARD. I do not like to put in a system with less than a half of a tenth of a foot to 100 feet. Of course, I would be content with less, if I could not get it.

Mr. HILTON. There are no so-called State ditches going directly into the Lake of the Woods?

Mr. WILLARD. No.

Mr. HILTON. And in your official capacity you simply have to do with State drainage ditches?

Mr. WILLARD. Yes.

Mr. HILTON. And for that reason you are not conversant with county and judicial ditches that may go into the Lake of the Woods?

Mr. WILLARD. No.

Mr. HILTON. Now have you been asked by the commission or anyone else to familiarize yourself with those drainage conditions going into the Lake of the Woods?

Mr. WILLARD. No.

Mr. HILTON. And the testimony you have given has been on general engineering propositions?

Mr. WILLARD. Absolutely general conditions.

Mr. HILTON. I bring this out for the record, so that it will appear that Mr. Willard had nothing to do with the drainage proposition that did go into the Lake of the Woods, and that will account for why he can not speak specially as to them.

Mr. LAIRD. None of the State ditches lead into any of the county or judicial ditches which empty into the Lake of the Woods? I assume they do not.

Mr. WILLARD. There may be and may not be such instances. There are some State ditches constructed in Beltrami County 10 or 12 years ago, and as I have no knowledge of the county or judicial ditches that have been laid out subsequent to that time, I do not know whether they affect the State ditches or not. It may barely be possible that some of these county or State ditches are dug in the same route as the State ditches.

Mr. LAIRD. And that the water from the county ditches flows into the State ditches?

Mr. WILLARD. Yes.

Mr. LAIRD. At the time those ditches to which you refer were constructed, where did they empty?

Mr. WILLARD. None of them emptied into the Lake of the Woods or tributaries directly.

Mr. GARDNER. For the purpose of illuminating this subject so far as we can, I would like to hear from Col. Patrick.

#### TESTIMONY OF COL. MASON M. PATRICK, OF THE CORPS OF ENGINEERS, UNITED STATES ARMY.

Col. MASON M. PATRICK, having been duly sworn, testified as follows:

Mr. PATRICK. I am only too glad to give the commission any information I possess.

Mr. MAGRATH. You know what we are talking about?

Mr. PATRICK. Yes; I think so.

Mr. POWELL. You heard the line of questions directed to the previous witness?

Mr. PATRICK. Yes.

Mr. POWELL. Please take that subject and give us your views on the matter.

Mr. PATRICK. As I understand, the questions have been directed to these witnesses to ascertain what would be the effect upon the system of drainage ditches if the level of the body of water into which they ultimately drain should be placed at any particular elevation and as to where the silting would take place in the ditches and what its effect would be.

Mr. POWELL. On the system generally. I think it goes without saying that wherever a stream of water, whether from a natural chan-



nel or from a ditch, enters quiet water, if the flowing stream bears matter in suspension, it will be deposited, and that deposit will occur to a greater or less extent, depending upon the amount of suspended matter. If the bottom of the ditch is placed at a particular elevation, and with the assumption that the bed of the still-water lake into which the ditch flows has quite a lengthy slope—that, I do not think was quite brought out by the witnesses here—the deposit will take place largely in the still water first, and as that builds up and checks the flow in the ditch or stream, that will go back until it reaches a point where the fall is sufficient for the water to carry the material farther, but if the level of the lake itself is raised to any extent whatever, it is merely the transferring of that point of emergence to the flowing stream from one position on the border of the lake at a certain level to another position farther back, and the same state of affairs exists.

Mr. POWELL. Take this particular instance: Say that the lake were increased in level from 1,057 to 1,060, at what height in the ditch would you say that any injurious effect would cease?

Mr. PATRICK. That depends so distinctly upon the grade of the ditch itself that you can not answer that question unless you know the profile of the ditch. If the ditch had a very slight slope, that effect would extend farther back than if the ditch were given greater slope.

Mr. GLENN. If the ditch were originally constructed at 1,057 and afterwards the level were increased to 1,060 or 1,062, it goes without saying that it would go farther back than if the land were level?

Mr. PATRICK. Assuming the land in the vicinity of the lake was very low lying, of course the lake's surface spreads over that at 1,060, and you extend your ditch out to that—

Mr. POWELL. Assuming you are following it up from the mouth of the ditch and you have the level of the bed of the ditch 3 feet above the level of the lake, you start in on the level of the lake and you follow your ditch till the grade carries you 3 feet high; about that point all possible injury to the system above would cease?

Mr. PATRICK. I think you can say that to the lands lying above that water it would be no detriment—any silting that would take place.

Mr. POWELL. In estimating the damage that would be done to the drainage system, you would confine yourself to that point, whether it be 3 or 4 feet, or two feet and a half; you would confine yourself to the low lands between the margin of the lake and that point—that is the only injury that would be done?

Mr. PATRICK. I would like to answer it in this way: That in estimating the damage that would be done to the drainage system, I would consider all damage that was done, but in general terms I would be inclined to believe there would be no damage above that point and all the damage would be to the low-lying land—

Mr. POWELL. Taking into account the damage to the drainage system, you would not consider anything above that point?

Mr. PATRICK. I should not consider it necessary to do so.

Mr. TAWNEY. For the benefit of those who may hereafter read this record, I should like you to state your position.

Mr. PATRICK. I am an officer of the Corps of Engineers of the United States Army, and have been engaged in engineering work for the United States for a number of years.

Mr. POWELL. Largely hydraulic?

Mr. PATRICK. Very largely hydraulic.

Mr. TAWNEY. In charge now of what?

Mr. PATRICK. At present I have charge of the Detroit River district, which takes in Lake Superior, and I have in addition charge of the surveys of the lakes and rivers which are being conducted under the Government of the United States.

Mr. TAWNEY. And the survey of the Lake of the Woods recently authorized by Congress is to be made by you, or under your directions?

Mr. PATRICK. Yes; of the Lake of the Woods and all boundary waters to Lake Superior is to be taken under my office.

Mr. MAGRATH. What character of survey?

Mr. PATRICK. Hydrographic survey; I had better qualify that by saying, so far as we know, the United States portions of those waters.

Mr. MAGRATH. In carrying a ditch through a stiff clay, what would be the maximum grade at which you would care to drop a considerable quantity of water?

Mr. PATRICK. Stiff clay is only a relative term, as you know, and I have known of beds—

Mr. MAGRATH. You know gumbo?

Mr. PATRICK. Yes. I know gumbo; that does not wash very readily, and your ditch might have quite a steep slope without great danger of any considerable erosion. I do not think I could give you any precise statement, but I do not think you could expect much erosion if it had a slope of 10 feet to the mile in very stiff clay. It is a difficult thing to state precisely, unless you know the soil, what slope would result in eroding the soil.

Mr. POWELL. With respect to the low land, if there was considerable silt coming down I suppose it would do considerable damage to the low land, inasmuch as the silt would spread out over it and injure vegetation?

Mr. PATRICK. Ultimately, yes; if they were cultivated and if the water were spread out over the land, it might or it might not; they would build up to a point where possibly there would be no overflow, and this rich deposit brought down might increase instead of diminish their value.

Mr. POWELL. You think there might be a benefit instead of an injury?

Mr. PATRICK. I do not know the character of the soil, but I have to answer it in that way.

Mr. POWELL. Looking at the soil there, it strikes me there would be no injury?

Mr. PATRICK. I do not know.

Mr. WYVELL. One of the witnesses said that if the lake had been maintained at a reasonably low level, say for the purpose of illustration at 1,057, that the wave action had maintained a sort of bank there, which rendered it difficult for water to stop there without being backed up upon higher lands, and that if the level of the lake were raised about 3 feet and a sort of loose shore line established, that the water would soak back further than the line of the lake. Have you anything to say about that?

Mr. PATRICK. The only thing that could have been meant by that, that if any body of water is maintained at a fairly constant level



there will be a certain amount of seepage take place by capillary attraction, which will bring the ground water level a little bit higher than the level of the water in the lake; now raise the lake and after a time a state of equilibrium will be brought about the same way. You will have your seepage until your soil gets saturated.

Mr. POWELL. That is new soil?

Mr. PATRICK. Yes.

Mr. LAIRD. Referring to Exhibit 7, Mr. Berkman indicated that there were some sales on it which he had reason to think were not genuine sales, which are tax titles. I would be glad if he indicate what ones they were, so that they may be definitely stated, and if he has any information as to any of these sales, personally I should be glad to be enlightened.

#### TESTIMONY OF MR. WILSON PHILIPS—Continued.

WILSON PHILIPS, who had previously testified, was recalled and continued his testimony as follows:

Mr. LAIRD. Mr. Philips, there was certain information that you were asked to furnish the commission. Have you that information with you?

Mr. PHILIPS. I have. I have here information showing the different levels; the level of the headrace, the level of the tailrace, and the head for four years taken at the Pinawa plant.

Mr. LAIRD. Mr. Wyvell, I believe you had some questions you wanted to ask Mr. Philips.

Mr. WYVELL. I thought he could fill that in without my going into it.

Mr. PHILIPS. The maximum flow is 10,000 second-feet and the minimum is 6,000 second-feet. That is practically correct. We have our own datum line. Our headrace is 87.4 to 89.5, and the tail water is 47 to 50.

#### TESTIMONY OF MR. GARRETT PETTINGELL, OF SELKIRK, MANITOBA.

GARRETT PETTINGELL, after being duly sworn, testified as follows:

Mr. LAIRD. You are the superintendent, I believe, of the Winnipeg, Selkirk & Lake Winnipeg Railway Co.?

Mr. PETTINGELL. Yes.

Mr. LAIRD. That is an electric railway running between here and Selkirk and also to Stonewall. Where is your office as superintendent?

Mr. PETTINGELL. At Selkirk.

Mr. LAIRD. That company for the operation of its entire system obtains power from what company?

Mr. PETTINGELL. From the Winnipeg Electric Railway Co.

Mr. MIGNAULT. Do you operate your line by electricity?

Mr. PETTINGELL. Yes.

Mr. LAIRD. What is the mileage between Winnipeg and Selkirk?

Mr. PETTINGELL. Twenty miles.

Mr. LAIRD. Then you have a line to Stonewall?

Mr. PETTINGELL. We operate to Stonewall over the same line for 5 miles and we branch off at that point and go 17 miles from there to Stonewall.

Mr. LAIRD. The town of Selkirk lies approximately north of here and Stonewall lies northwest?

Mr. PETTINGELL. Yes.

Mr. LAIRD. How long has the line been in operation as an electric line to Selkirk?

Mr. PETTINGELL. Eight years.

Mr. LAIRD. Prior to that I believe it was operated as a steam road?

Mr. PETTINGELL. Yes, sir.

Mr. LAIRD. The line runs along the highway, I believe, for most of the way to Selkirk?

Mr. PETTINGELL. All the way to Selkirk, practically.

Mr. LAIRD. Can you tell us the number of passengers you have carried during the last 3 years?

Mr. PETTINGELL. We carried in 1913 563,167.

Mr. LAIRD. How many in 1914?

Mr. PETTINGELL. In 1914 we carried 653,010.

Mr. LAIRD. How many did you carry last year?

Mr. PETTINGELL. Last year—1915—we carried 652,199.

Mr. LAIRD. That includes the passengersto both Selkirk and Stonewall last year?

Mr. PETTINGELL. Yes.

Mr. LAIRD. The line to Stonewall, I believe, only commenced operation recently?

Mr. PETTINGELL. In December of last year.

Mr. LAIRD. In December of 1914?

Mr. PETTINGELL. Yes.

Mr. LAIRD. Then, I believe, the cars and equipment that you have on that suburban line differ considerably from the cars on the ordinary city lines?

Mr. PETTINGELL. Yes.

Mr. LAIRD. Describe them briefly to the commission.

Mr. PETTINGELL. They are cars equipped with four 75-horsepower motors. They are 57 feet over all in length.

Mr. LAIRD. As to the speed they travel, how do they compare with ordinary city cars?

Mr. PETTINGELL. They are very much faster.

Mr. LAIRD. What is their seating capacity?

Mr. PETTINGELL. They have a seating capacity of 64 passengers.

Mr. LAIRD. What rate of speed do they develop?

Mr. PETTINGELL. They develop 45 miles an hour.

Mr. LAIRD. In addition to this passenger traffic business your company, I believe, supplies light and power to the citizens along the line?

Mr. PETTINGELL. Yes.

Mr. LAIRD. How many light and power customers have you along these lines?

Mr. PETTINGELL. We have 275 customers scattered along our line.

Mr. LAIRD. Does that include both light and power?

Mr. PETTINGELL. Yes; but there is practically no power at present.

Mr. LAIRD. One of your customers, I believe, is the corporation of Selkirk?



Mr. PETTINGELL. Yes.

Mr. LAIRD. Will you explain that briefly? What do you do there?

Mr. PETTINGELL. We sell power to the town of Selkirk in bulk at \$30 per horsepower per annum.

Mr. LAIRD. And the town of Selkirk, in turn, distributes it and lights the streets?

Mr. PETTINGELL. Yes.

Mr. LAIRD. What else do they do?

Mr. PETTINGELL. They sell power.

Mr. LAIRD. In mentioning the number of customers you have you do not include any of the citizens of Selkirk?

Mr. PETTINGELL. No.

Mr. LAIRD. They deal directly with the citizens?

Mr. PETTINGELL. Yes; they do all the distribution themselves.

Mr. LAIRD. What population has the town of Selkirk?

Mr. PETTINGELL. Thirty-six hundred.

Mr. LAIRD. Can you mention some of the industries to which it in turn supplies electric power?

Mr. PETTINGELL. They supply power to the Government dry dock.

Mr. LAIRD. That is a Dominion Government dry dock?

Mr. PETTINGELL. Yes.

Mr. LAIRD. That was built this last year also?

Mr. PETTINGELL. Yes.

Mr. LAIRD. What is that for?

Mr. PETTINGELL. It is for repairing boats. It is the only means now of bringing out boats from Lake Winnipeg for repair.

Mr. LAIRD. Selkirk, generally speaking, is the head port of the Lake Winnipeg navigation?

Mr. PETTINGELL. Yes.

Mr. LAIRD. Do you know the amount of power that the Dominion Government uses for that dry dock?

Mr. PETTINGELL. I do not know what they use. I know they use a large amount of power, but it is only for short periods of time.

Mr. LAIRD. What other institutions of Selkirk are making use of power from the town?

Mr. PETTINGELL. We have a rolling mill there. They were using quite a large bulk of power. It is closed down now, of course, on account of the general depression.

Mr. LAIRD. Do you know the quantity of power they were using?

Mr. PETTINGELL. No; I do not know what they were using.

Mr. LAIRD. You have spoken of the present condition. Now in the district between here and Selkirk the line of railway, I believe, runs along the highway on the west side of the river. How close to the river is it at different points?

Mr. PETTINGELL. It varies from a quarter of a mile to a mile.

Mr. LAIRD. What have you to say as to the population along that district and the growth of it since the line has been in operation?

Mr. PETTINGELL. The population, I would say, has trebled since the road was started.

Mr. LAIRD. What extensions of the line are there? Is there any desire or request for extensions of the line? Take north of Selkirk, for example.

Mr. PETTINGELL. Yes; there has been a request there. They have quite a dense population north of Selkirk for six miles along the river.

Mr. LAIRD. Would you say it would be feasible from a paying point of view to operate an electric railway through that district?

Mr. PETTINGELL. It certainly would.

Mr. LAIRD. Take the Stonewall end of the line; do you know the conditions there with regard to extension and the desire of the citizens there for such extension?

Mr. PETTINGELL. Yes; there is a splendid field there for about 12 miles north of the present terminus.

Mr. LAIRD. In addition to the passenger traffic, I believe your line also carries freight?

Mr. PETTINGELL. Yes; we carry a lot of freight for all that north country.

Mr. LAIRD. That is, the freight business between Winnipeg and Selkirk is practically done by your railway?

Mr. PETTINGELL. Yes; all package freight. Carload freight goes by the C. P. R., but we handle all the package freight.

Mr. LAIRD. That package freight is largely freight that is sent up to the various settlements on the shores of Lake Winnipeg?

Mr. PETTINGELL. Yes.

Mr. LAIRD. It is shipped from Selkirk by boat?

Mr. PETTINGELL. With the exception of the vegetable season, of course. Then the bulk of our freight consists of garden stuff.

Mr. LAIRD. That is another point. Your freight to Selkirk is package freight. Now, what is the nature of the freight from Selkirk into Winnipeg?

Mr. PETTINGELL. That is fish from the fish companies.

Mr. LAIRD. Is the fishing industry a large one on Lake Winnipeg?

Mr. PETTINGELL. Yes; that is the principal industry there.

Mr. LAIRD. And that is brought into Winnipeg by your road?

Mr. PETTINGELL. Yes; from Selkirk.

Mr. LAIRD. What other products do you bring in?

Mr. PETTINGELL. Vegetables.

Mr. LAIRD. Vegetables for the Winnipeg markets?

Mr. PETTINGELL. Yes.

Mr. LAIRD. Can you give us any figures as to the number of trains you operate a day or the quantity of freight you carry?

Mr. PETTINGELL. We operate a round trip freight every day; one train every day.

Mr. LAIRD. Throughout the whole season?

Mr. PETTINGELL. Yes; to and from Winnipeg.

Mr. LAIRD. Can you give me the tonnage of freight you carry?

Mr. PETTINGELL. I have not the accurate tonnage, but it varies very materially. We carry all the way from 10 to 40 tons of freight a day.

Mr. GLENN. How much horsepower are you using now at that place?

Mr. PETTINGELL. I could not tell you what we use for our railway purposes. I can get it for you very easily, but I can not tell you off-hand.

Mr. GLENN. We are thoroughly satisfied that all these electric railways are doing a big business. Now we would like to know what



horsepower you use. What are you capable of using under your present system of generating, and at what level is the lake at the time?

Mr. PETTINGELL. That, of course, can all be supplied by our engineering department.

Mr. GLENN. You use steam, do you not?

Mr. PETTINGELL. No; we do not use any steam.

Mr. ANDERSON. Of course you understand that this company gets its power and energy from the Winnipeg Electric Railway Co.

Mr. LAIRD. That is clear, Mr. Pettingell; you buy all your power from the Winnipeg Electric Railway Co. and it brings it in from the Winnipeg River?

Mr. PETTINGELL. Yes. We are just consumers of electric power. We are not producers of the power.

#### TESTIMONY OF HARRY HARTWELL, OF WINNIPEG, CANADA.

HARRY HARTWELL, after being duly sworn, testified as follows:

Mr. LAIRD. At present, Mr. Hartwell, you are acting manager of the Winnipeg Electric Co.?

Mr. HARTWELL. That is true.

Mr. LAIRD. Mr. Wilford Philips, the manager, is absent on leave?

Mr. HARTWELL. Yes, sir.

Mr. LAIRD. You have just been acting in that capacity for about a month, I believe?

Mr. HARTWELL. About 15 days.

Mr. LAIRD. Prior to taking over those duties, what was your work?

Mr. HARTWELL. I represented the Pierson Engineering Corporation as engineer in charge of the designs for the Winnipeg River power plant, a subsidiary of the Winnipeg Electric Railway Co.

Mr. LAIRD. That corporation is an engineering corporation of the city of New York?

Mr. HARTWELL. New York and Toronto.

Mr. LAIRD. And it is engaged largely in the construction of hydroelectric plants?

Mr. HARTWELL. Yes.

Mr. LAIRD. You were their representative in Winnipeg in connection with the proposed development of a hydroelectric plant on the Winnipeg River?

Mr. HARTWELL. That is true.

Mr. LAIRD. And that company by whom you were employed was the Winnipeg River Power Co.?

Mr. HARTWELL. Yes.

Mr. LAIRD. That company, I believe, is owned by the Winnipeg Electric Railway Co. Now, will you tell the commission about the proposed development of this power on the Winnipeg River? First, what is it known as?

Mr. HARTWELL. It has been called the Great Falls development; perhaps more truly the Grand du Bonnet Falls.

Mr. LAIRD. Where are they located?

Mr. HARTWELL. They are about 13 miles north of the town of Lac du Bonnet, on the Winnipeg River.

Mr. LAIRD. About how many miles farther downstream than the present plant of the Winnipeg Electric Railway Co. at Pinawa?

Mr. HARTWELL. That is about 40 miles by the river.

Mr. LAIRD. You have been engaged in the preparation of plans and the development of that plant for how long as a representative of the Pierson Engineering Corporation?

Mr. HARTWELL. July a year ago we came out.

Mr. LAIRD. What has been done?

Mr. HARTWELL. Preliminary plans and studies have been made for the complete development, and plans are ready for the beginning of construction whenever the enterprise is financed.

Mr. LAIRD. I believe at the present time if it had not been for the financial depression it was expected that the work would have been in actual construction before this.

Mr. HARTWELL. Yes.

Mr. LAIRD. As preliminary to that construction what has been done in addition to the plans you have referred to?

Mr. HARTWELL. The railway has been constructed from Lac du Bonnet down to the site.

Mr. LAIRD. That is, the Canadian Pacific Railway line runs through the village of Lac du Bonnet?

Mr. HARTWELL. Yes; and the Winnipeg River Railway Co. was formed to build this road for construction purposes.

Mr. LAIRD. That is, it is more economical to construct a railway into the proposed plant than to carry the machinery and material in by any other means?

Mr. HARTWELL. Yes.

Mr. LAIRD. How long has that railway been constructed?

Mr. HARTWELL. The road was finished in October, a year ago.

Mr. LAIRD. October, 1914?

Mr. HARTWELL. October, 1914.

Mr. LAIRD. And it runs a distance of 13 miles?

Mr. HARTWELL. Thirteen and a half miles, from Lac du Bonnet.

Mr. LAIRD. The purpose of the development of this electric power was what? Where was the market?

Mr. HARTWELL. Primarily in Winnipeg.

Mr. LAIRD. And the needs, I suppose, of the Winnipeg Electric Railway Co. and the district?

Mr. HARTWELL. That is true. The present hydraulic plant had reached its limit.

Mr. LAIRD. The company acquired this site and has gone ahead with these plans?

Mr. HARTWELL. Yes.

Mr. POWELL. What is the object of these details?

Mr. LAIRD. I am trying to avoid details as much as possible.

Mr. POWELL. Well, you are not very successful, I can assure you.

Mr. LAIRD. There is an immense amount of detail I have avoided, anyway. I will put it that way.

Mr. POWELL. Can you not jump to the salient features?

Mr. LAIRD. I would be very glad to have the commissioners ask Mr. Hartwell any questions. Mr. Hartwell, will you describe the proposed development—that is, the head and the quantity of electric power that can be developed, and what you expect to get from the construction of this plant?



Mr. HARTWELL. The head of the initial development is about 46 feet, and there is a possibility of adding another 10 feet by taking out reefs about  $2\frac{1}{2}$  miles down the stream, making an ultimate development of about 56 feet of head. Those elevations were laid down by the Dominion Government in their water-power branch service. We have taken very much of the data from the Government records and checked the surveys sufficiently to satisfy ourselves that for present purposes the surveys are accurate enough for us to use, and they have proved accurate in every respect. We have used also the Government discharge curves of the river discharge records. We based our calculations on securing, perhaps, 20,000 to 24,000 second-feet, dependent upon the present issue; that is, what the commission decides can be secured out of the Lake of the Woods. The maximum daily discharge required in the past eight years has been about 53,000 cubic feet and a minimum of about 12,000. We have assumed that the average run-off for high water would be about 40,000 cubic feet per second and the average low run-off about 16,000. A reservoir will be created by this dam which will have about 1,900 acres, while maintaining the water at 808, which is the elevation fixed by the water-power branch as the crest of the dam. There is an island in the middle of the river and the dam will go across this island, crossing the opposite channel, and on the west channel the power house will be located.

Mr. LAIRD. Have you any plans or photographs of that that you can give to the commission?

Mr. HARTWELL. Yes; here are some photographs.

Mr. LAIRD. Well, we can put them in later. Do you know the other undeveloped power sites on the Winnipeg River?

Mr. HARTWELL. The only ones I have seen are the McArthur Falls and the Grand du Bonnet Falls.

Mr. GLENN. Are there not falls there known as the Pine Falls?

Mr. HARTWELL. Yes, sir; but the McArthur Falls are farther upstream. We back the water up to the foot of the McArthur Falls.

Mr. LAIRD. How does the site at Grand du Bonnet compare with the site at McArthur Falls?

Mr. HARTWELL. I have not examined the site at McArthur Falls sufficiently to express an opinion as to its feasibility, but as it has a low head it is not desirable from that point of view.

Mr. LAIRD. You have been engaged in these developments of electric plants for how long? How long have you been engaged as an engineer in this work?

Mr. HARTWELL. I have been in the public utility business for about 22 years.

Mr. LAIRD. Can you tell me, approximately, the expenditure that the Winnipeg River Power Co. has made on the development of this site?

Mr. HARTWELL. Up to the present time, do you mean?

Mr. LAIRD. Yes; indicate generally to the commission the magnitude.

Mr. HARTWELL. The expenditure on the railway is approximately about \$180,000, and about \$400,000 has been expended in general expenses in acquiring rights, etc.

Mr. LAIRD. That covers the acquiring of sites and the work that has been done to date?

Mr. HARTWELL. Yes.

Mr. LAIRD. The purpose was to get a supply of power for the needs of the Winnipeg Electric Railway Co. and its customers?

Mr. HARTWELL. That is true.

Mr. LAIRD. At present the contract for the work has not been let because of the financial conditions?

Mr. HARTWELL. Nothing has ever been done at the site beyond a little clearing.

Mr. LAIRD. This, I believe, Mr. Hartwell, is a photograph of a prospective drawing.

Mr. HARTWELL. (examining photograph) That is a photograph of a prospective drawing.

(The photograph referred to was marked "Exhibit No. 13.")

Mr. LAIRD. The building shown on the right-hand side of the photograph is the power house?

Mr. HARTWELL. Yes.

Mr. LAIRD. That is situated on what side of the river?

Mr. HARTWELL. That is on the west side.

Mr. LAIRD. Mr. Hartwell, as to the completion of this development and the actual bringing in of electric current to the city of Winnipeg and the surrounding districts, I suppose that depends upon what? Can you make any definite statement to that? What information can you give the commission? How soon would the company contemplate having its power?

Mr. HARTWELL. We have allowed a construction period of about three years, and the starting of the enterprise depends entirely on the money market.

Mr. LAIRD. You said that it was expected that it would be under actual construction by this date if it had not been for the financial depression of this year?

Mr. HARTWELL. Yes. We expected to go to work in July, 1914.

Mr. LAIRD. I suppose you are not familiar with the conditions on the Lake of the Woods and the water there? Your work has been designing these plants and the preparation for their construction?

Mr. HARTWELL. Yes; I have very little actual knowledge of the conditions on the Lake of the Woods, although I have seen the Norman Dam and have been to Kenora and seen the outlets.

Mr. LAIRD. As to the range of levels I do not suppose you care to express any opinion?

Mr. HARTWELL. No more than to say we would like to have them as high as possible and get as much water down through Grand du Bonnet as possible.

Mr. LAIRD. That is for the operation of this proposed plant?

Mr. HARTWELL. The greater the assured flow the cheaper will be the development per horsepower.

Mr. WYVELL. Mr. Hartwell, will you please explain what the height of the Lake of the Woods has to do with the matter of securing the efficient use of the water at your plant?

Mr. HARTWELL. It is a matter of storage.

Mr. WYVELL. Then the efficient use of the water at the plant which you have under construction depends upon the amount and uniformity of the flow, does it not?

Mr. HARTWELL. Precisely.



Mr. WYVELL. Therefore, if the amount and uniformity of flow can be secured the height at which the Lake of the Woods remains is immaterial so far as your plant is concerned, is it not?

Mr. HARTWELL. Yes.

Mr. WYVELL. You heard Mr. Philips' testimony just now, did you not?

Mr. HARTWELL. No; I just came in.

Mr. WYVELL. Well, he so stated; that is, if the range of levels is sufficient to allow storage, so that the greatest possible use of the waters can be obtained at your plant, you do not care what the height of the Lake of the Woods is?

Mr. HARTWELL. No.

Mr. GLENN. Do you know what the level maintained on the Lake of the Woods now is?

Mr. HARTWELL. I can not say what the elevation is.

Mr. GLENN. With the present levels, can you get all the power you want?

Mr. HARTWELL. Do you mean by the existing plant—the Pinawa plant?

Mr. GLENN. No; the new one.

Mr. HARTWELL. No; we do not; that is, the flow is not uniform.

Mr. GLENN. I am not asking about that. Suppose it was maintained at a uniform rate not higher than it is at present, would you get all the power you needed?

Mr. HARTWELL. We might get all the power we needed for certain development, but—

Mr. GLENN. I am speaking of these developments that you have under contemplation. You have spoken of contemplated developments. Now, if you maintained it at a uniform rate at its present level or about that, would you get all the power needed to operate your contemplated development?

Mr. HARTWELL. I do not know. We want the largest quantity of water uniformly brought down that it is possible to obtain.

Mr. GLENN. Well, what level do you want, then?

Mr. HARTWELL. At the Lake of the Woods?

Mr. GLENN. Yes.

Mr. HARTWELL. That is immaterial to us so long as we get the water.

Mr. GLENN. So long as it is uniform?

Mr. HARTWELL. So long as it is uniform and we get the quantity.

Mr. ANDERSON. You must get both?

Mr. HARTWELL. Yes.

Mr. GLENN. Will the level have any effect on that—whether it is high or low—if it is uniform?

Mr. HARTWELL. No, sir. The uniformity of flow is what we want. The larger the quantity and the more uniform, the better it would be for the plant—the more power we can get out of it for the money expended.

Mr. GLENN. And it does not make very much difference whether it is maintained at 1,057, 1,058, or 1,062.

Mr. HARTWELL. It does not make any difference.

MR. ANDERSON. That is, so long as they give you the water it does not matter how they give it to you, if they give it to you uniformly and in sufficient quantities.

MR. HARTWELL. That is it.

MR. ANDERSON. They can regulate it in the Lake of the Woods so long as it is practicable to give you that?

MR. HARTWELL. Exactly.

MR. ANDERSON. Your plans are based on and contemplate the use of the water you mention?

MR. HARTWELL. Yes, sir.

MR. ANDERSON. To what extent does the financing of your scheme depend upon getting this controlled supply of water?

MR. HARTWELL. If we can only depend on say 12,000 or 14,000 second-feet during the low water stage, the capacity of the plant will be so much less.

MR. ANDERSON. But, Mr. Hartwell, in a broad way do you think you can make your financial arrangements to build that plant unless this control is in contemplation and there is a reasonable expectation of its being carried out?

MR. HARTWELL. I do not think we can.

MR. ROCKWOOD. Mr. Hartwell, I infer that one of your answers has been misunderstood. Do you mean in any way to express an opinion that the high and uniform flow which you desire can, as a matter of fact, be reached without a high level of the Lake of the Woods?

MR. HARTWELL. My personal opinion is that the level of the Lake of the Woods would have to be greater than is maintained at the present time.

MR. ROCKWOOD. In other words, in order to get the highest and most uniform flow it is necessary to get the highest feasible level of the Lake of the Woods? Is that what you mean?

MR. HARTWELL. I would say so. It is the greatest storage capacity.

MR. GLENN. You do not know the present level?

MR. HARTWELL. No; I do not.

MR. WYVELL. What studies have you ever made of the Lake of the Woods?

MR. HARTWELL. I have followed the matter in a general way. I have not made any surveys there at all.

MR. WYVELL. We will assume that there are 5 feet draft on the Lake of the Woods, and that within the range of the 5 feet draft there is a certain billion cubic feet of water, and that that certain billion cubic feet of water can be let down the Winnipeg River at a certain rate of cubic feet per second, regardless of the height of the Lake of the Woods, so that the flow down the Winnipeg River will be uniform. Will you please explain how the height of the Lake of the Woods can have any bearing whatever upon the efficiency of the use of the water at your place?

MR. HARTWELL. We do not care how you give it to us, that is, what levels you maintain, so long as we get the water.

MR. WYVELL. In other words, to get the efficient use of the water at your plant you must have two things, the greatest possible flow and the greatest possible uniformity?

MR. HARTWELL. Yes.

MR. WYVELL. And that is all, is it not?



Mr. HARTWELL. Yes.

Mr. WYVELL. Therefore, the height of the Lake of the Woods, so long as you get those two factors, is absolutely immaterial, is it not?

Mr. HARTWELL. So far as we are concerned.

Mr. MIGNAULT. That does not follow, Mr. Wyvell. It may be necessary to regulate the levels of the Lake of the Woods to give him those factors, so your question does not dispose of the difficulty.

(Thereupon, at 12.30 o'clock p. m., the commission took a recess until 2.30 o'clock p. m.)

#### AFTER RECESS.

The commission reassembled at the expiration of the recess.

Mr. LAIRD. Mr. Chairman, I mentioned this morning that I had a certificate as to the assessed value of the lands covered by the deeds from Beltrami County. I now file it. You understand that this does not affect the land immediately adjoining the lake, but is of use to show the value of lands mentioned in those deeds and the value of the improvements upon those lands.

(The paper referred to was marked "Exhibit No. 14.")

Mr. BERKMAN. The paper is objected to on the same grounds as stated this morning with regard to the introduction of the other lists.

#### TESTIMONY OF MR. ROBERT MAURICE, OF SELKIRK, MANITOBA.

ROBERT MAURICE, after being duly sworn, testified as follows:

Mr. LAIRD. Mr. Maurice, you are the lighting and water superintendent of the town of Selkirk, I believe?

Mr. MAURICE. Yes, sir.

Mr. LAIRD. You have been in that position since the town commenced its own lighting?

Mr. MAURICE. Yes, sir.

Mr. LAIRD. You purchased a block of electric power from the Selkirk Railway Co. and do your own disposing of it?

Mr. MAURICE. Yes, sir.

Mr. LAIRD. What do you use it for?

Mr. MAURICE. For domestic lighting, commercial power, heating, and cooking.

Mr. LAIRD. And street lighting?

Mr. MAURICE. Yes, sir; and municipal pumping.

Mr. LAIRD. How many customers have you for lighting purposes?

Mr. MAURICE. We have 502 meters connected, including all the services; that is, light, power, heat, and street lighting.

Mr. LAIRD. Can you tell us the number of light consumers?

Mr. MAURICE. Yes, sir; 31 of the 502 are heating, 31 heating and cooking, 10 commercial power, and the remainder domestic lighting.

Mr. LAIRD. The city sells this light to these consumers on its own terms, I suppose?

Mr. MAURICE. Yes, sir.

Mr. LAIRD. This morning it was said that one of your consumers was the Dominion Government in connection with its dry-dock; that it was the largest consumer as to power.

Mr. MAURICE. Yes, sir.

Mr. LAIRD. Are there any other large contracts?

Mr. MAURICE. We have the Manitoba Rolling Mills with an installation of 50 horsepower.

Mr. LAIRD. What next have you?

Mr. MAURICE. A pulp and paper mill under construction, and they have made application for about 200 horsepower with the expectation of increasing it later. They have not signed up yet.

Mr. LAIRD. They have not made any contract yet?

Mr. MAURICE. No; they have not made any contract yet.

Mr. LAIRD. Then you supply electricity to the provincial asylum?

Mr. MAURICE. Yes; both for light and power purposes.

Mr. LAIRD. What are the prospects for further requirements of electric power for all purposes in the town of Selkirk and in the district, from your knowledge of two years?

Mr. MAURICE. I believe that with the present population of Selkirk you could add perhaps 100 more consumers for heating and cooking.

Mr. LAIRD. Considering the expected development in a great deal of the district, what have you to say as to the future electrical needs?

Mr. MAURICE. We have 75 per cent of the possible houses wired. Of course, there is a possible chance of 25 per cent increase in the domestic lighting. The rolling mills would use a great deal more, I think, and the Government ship-building yards would no doubt use more in the future when business gets better.

Mr. LAIRD. Prior to the town undertaking this work, I believe it was conducted by a private company?

Mr. MAURICE. Yes, sir.

Mr. LAIRD. What became of that company?

Mr. MAURICE. That company shut down three months before—

Mr. LAIRD. I believe it became bankrupt, financially.

Mr. MAURICE. Yes, sir.

Mr. LAIRD. It developed its electricity in what way?

Mr. MAURICE. By steam.

Mr. LAIRD. It operated a plant in the town of Selkirk?

Mr. MAURICE. Yes, sir.

Mr. LAIRD. None of the other towns, I believe, operate under the same basis as you do? Selkirk has been the first one in Manitoba to make such arrangements?

Mr. MAURICE. Yes, sir.

Mr. LAIRD. How has it proved for the town, speaking from the point of view of the corporation and of the citizens?

Mr. MAURICE. The service has been satisfactory, I believe. A great many citizens have approved of it and we have earned a profit of between \$5,000 and \$6,000 a year.

Mr. LAIRD. That is, the town corporation has done that?

Mr. MAURICE. Yes, sir.

Mr. LAIRD. Does that go into the town funds, or do you propose to reduce the prices?

Mr. MAURICE. We have made eight reductions.

Mr. LAIRD. You have made eight reductions since you commenced two years ago?

Mr. MAURICE. Yes, sir.



Mr. LAIRD. I think that is all. This is about the first example in Manitoba of the use of power in this way, but it is anticipated that the other towns as soon as they can will make similar arrangements.

Mr. TAWNEY. Mr. Rockwood, have you anything you want to offer?

Mr. ROCKWOOD. Mr. Chairman, I sent to the American secretary of the commission, Mr. Kluttz, a few weeks ago, at his request, a statement of the industries at Fort Frances and International Falls, showing how the power is used there and the number of men directly and indirectly employed, also a statement of other industries in Minnesota along the Rainy River, particularly at International Falls and Spooner and Baudette. These industries were chiefly lumber industries. I suggest that the information be placed in the record if the commission so desires.

(The information referred to by Mr. Rockwood, which is contained in a letter to Mr. Kluttz under date of January 8, 1916, is as follows:)

JANUARY 8, 1916.

Mr. WHITEHEAD KLUTTZ,

*Secretary, International Joint Commission, Washington, D. C.*

DEAR SIR: In reply to your request for information respecting the power interests, including the number, ownership, size and value of all plants engaged in business on this side of the line, and any other facts and statistics of value in connection with the Lake of the Woods investigation, I beg to say that I know of only one power plant that has been developed and of only two more that are capable of development within the immediate field of the commission's inquiry, namely, from Lakes Namakan and Kabetogama to Lake of the Woods.

The developed power is at Koochiching Falls, between International Falls and Fort Frances. The dam in Rainy River furnishes a head varying from 24 feet to 34 feet.

The average of the total power developed during the past five years and eight months that the dam has been in operation is approximately 20,000 continuous horsepower.

The half on the Canadian side is used by the Ontario and Minnesota Power Co. (Ltd.), and the Fort Frances Pulp & Paper Co. (Ltd.), in grinding wood pulp and manufacturing news print paper and in generating electricity. The output of the paper mill when running to capacity is about 130 tons per day for about 310 days in the year. About 30 per cent of the power on the Canadian side is used for generation of electricity and transmission to the American side for use chiefly in the paper mill of the Minnesota & Ontario Power Co.

The power on the American side is used by the Minnesota & Ontario Power Co. almost exclusively for the manufacture of wood pulp and news print paper. The output of the paper mill when running to capacity is about 220 tons per day for 310 days in the year.

The two, perhaps, are closely allied in ownership and management. The paper industry furnishes employment at the mills and yards for about 1500 men, 60 per cent approximately of whom are employed on the American side and 40 per cent on the Canadian side. These industries furnish employment to approximately 2,500 men in the cutting, handling, and transporting of the wood which supplies the mills.

The amount paid out annually for pulp-wood delivered at the mills is approximately \$1,000,000. The consumption is relatively somewhat larger on the American side because of the fact that the entire supply of sulphite fiber is produced on this side for both paper mills.

There is undeveloped water power at the Long Sault Rapids in Rainy River, about 40 miles below International Falls. A head of from 12 to 15 feet can be developed without unduly affecting the tail-water at Fort Frances and International Falls. The flow of water is considerably larger because of the influx of the Little Fork, Big Fork and Black Rivers below the rapids. The watersheds of these streams, however, have no facility for storage, and a great percentage of the water runs off in such freshets as to be incapable of advantageous use at the Long Sault. The power developed by dam at this point would

be somewhat greater in proportion to the head than the power above indicated at Koochiching Falls.

The actual development which may be made at the Long Sault will undoubtedly be somewhat greater if the ownership is in harmony with the ownership at Koochiching Falls because of the fact that damage caused by raising the tail water at the latter point will be offset by the increased head at the Long Sault. Adverse ownership of the two would result probably in such head only at the Long Sault as might be developed without appreciable effect upon the tail water at Koochiching Falls. Both powers are now so owned as to permit harmonious action.

There is a drop, varying in different stages, of six to eight to ten to twelve feet at the outlet of Lake Namakan, Kettle Falls. The power rights on the American side are owned by private interests, and by the Ottawa Government on the Canadian side. Because of low head and remoteness from railroads, there is, as I understand, no present prospect of the development of water power at Kettle Falls.

The only other industry of magnitude along this waterway is lumber. The sawmill at International Falls owned by the International Lumber Co. has a capacity of about 100,000,000 feet per annum, and another mill located at Spooner, Minn., owned by the same company has a capacity of about 60,000,000 feet per annum. The Engler Lumber Co. operates a sawmill at Baudette of capacity of 30,000,000 feet per annum. The number of men employed directly and indirectly in these lumber industries is around 3,000.

Agriculture is developing along this waterway, but I have no statistics or reliable information of its aggregate extent.

I am not able to add anything to the facts which have heretofore been given to the commission upon the subject of navigation and fisheries.

Very truly, yours,

C. J. ROCKWOOD.

Mr. Rockwood. I have prepared here and will hand to the reporter and to the secretary a very brief statement of the plans and needs of the Keewatin Power Co. (Ltd.) at the Norman Dam. It is only one page, and I will read it so that the commission will have it:

The Keewatin Power Co. (Ltd.) constructed the Norman Dam in 1894 and 1895 in the hope of finding industries that would consume the power and yield an income on the investment. Instead of that, the only purpose so far served has been the regulation of the flow by Government control in the public interest.

The company now has some prospect of utilizing the power for the manufacture of pulp and paper, if sufficient continuous and reliable power is available. The minimum required for profitable operation is 20,000 continuous dependable horsepower. Three things are necessary to realize this—the highest feasible stage in the lake; the largest storage in and back of the lake; the enlargement of the openings above and below to the necessary size for power and discharge without destruction of the head.

The ultimate output contemplated by full development is 200 tons of ground-wood pulp and 250 tons of paper daily for 312 days in the year. The total number of men occupied will be about 3,000, of whom approximately one-third will be required at the works and the remainder in procuring and transporting material. This would call for an investment of six or seven million dollars.

We believe the choice between methods A and B or modifications thereof should be left for the light of experience.

In view of existing conditions and the uncertainty as to what will be decided upon, nothing will or can be done until final decision has been reached by this commission.

To the statement that I previously read I wish to add this one fact that I did not know specifically at the time. The actual investment in constructing the Norman Dam was very close to \$250,000. That, of course, was private investment. Now, I want to ask Mr. Ferguson to take the stand for a moment.

Mr. ANDERSON. Before Mr. Ferguson makes any statement I would like to ask Mr. Rockwood if he would be good enough to file with the commission evidence of title of the Ontario & Minnesota Power Co.



and the Minnesota & Ontario Power Co. to the right to build the dam at International Falls.

Mr. TAWNEY. It was presented in evidence at International Falls.

Mr. ANDERSON. Then that is all right so far as that is concerned. How about the title to rights on the American side?

Mr. ROCKWOOD. The title for the American side is a fee title of the riparian land with this qualification, that the title to the dam itself is in the Rainy River Improvement Co., a company organized for the improvement of that and navigation. The power is actually used for manufacturing purposes by the Minnesota & Ontario Power Co., which owns the riparian land.

Mr. ANDERSON. And by virtue of the ownership of the riparian land it has the right to utilize the water?

Mr. ROCKWOOD. Yes. Acts of Congress authorized the construction and the plans were approved by the Secretary of War.

Mr. ANDERSON. Do you happen to know now the chapter, so to speak, of the act of Congress and the year, so that it may be noted in the record?

Mr. ROCKWOOD. I can give the date of the final act. There was a series of acts. I could not give them all.

Mr. TAWNEY. It was in 1909, the last one, was it not?

Mr. ROCKWOOD. My recollection is that it was in 1908, but I can furnish a list of those acts if such information has not been already furnished. I really think it has been.

Mr. ANDERSON. Then the Rainy River Improvement Co. is an American corporation?

Mr. ROCKWOOD. It is a Minnesota corporation. It is incorporated under the general laws of the State of Minnesota.

Mr. HILTON. Do I understand you to say, Mr. Rockwood, that you would furnish for the commission and have put in the record the various acts of Congress under which your companies rely for the exercise of your rights?

Mr. ROCKWOOD. Yes; I will do that if I find it has not been done. If I find it has been done I will give you the reference.

#### TESTIMONY OF MR. HARDY S. FERGUSON, OF NEW YORK, N. Y.

HARDY S. FERGUSON, after being duly sworn, testified as follows:

Mr. ROCKWOOD. Mr. Ferguson, you are a hydraulic engineer residing and practicing in the city of New York?

Mr. FERGUSON. Yes, sir.

Mr. ROCKWOOD. Will you state very briefly with what power constructions and manufacturing developments you have been connected?

Mr. FERGUSON. I have been connected for the past 25 years with several large power developments and industrial plants, mostly devoted to the manufacture of pulp and paper, and the power developments being used principally in connection with that.

Mr. ROCKWOOD. Mention one or two of the larger ones that you have actually had experience with.

Mr. FERGUSON. The Great Northern Paper Co. and the Berlin Mills Co., both of New England, are perhaps the most important.

Mr. ROCKWOOD. What is the capacity of each of those companies?

Mr. FERGUSON. The Great Northern Paper Co. I think at the

present time manufactures about 600 tons of paper daily, and the Berlin Mills Co. something over 200 tons daily, both of these companies having increased their production somewhat since I had any connection with them.

Mr. ROCKWOOD. Do they use water power entirely?

Mr. FERGUSON. Substantially so; yes, sir.

Mr. ROCKWOOD. Mr. Ferguson, you have been present during the sessions of the commission here at Winnipeg this week?

Mr. FERGUSON. I have.

Mr. ROCKWOOD. You have heard all the testimony?

Mr. FERGUSON. I think nearly all of it.

Mr. ROCKWOOD. You have examined the report of the consulting engineers?

Mr. FERGUSON. I have, quite carefully.

Mr. ROCKWOOD. Do you, in general, accept the data and conclusions shown in those reports?

Mr. FERGUSON. I do.

Mr. ROCKWOOD. Now, Mr. Ferguson, will you be kind enough to state with reference to the possible use of the power for manufacturing paper at the outlet of the Lake of the Woods, and in connection with the western outlet, what features of the report, if any, and what facts and recommendations, if any, you think ought to be emphasized?

Mr. FERGUSON. At the western outlet of the Lake of the Woods the principal features that have a bearing on the manufacture of pulp and paper at that point are, of course, the total quantity of dependable water which can be had there, and, as bearing upon that, the head or quantity of water which can be utilized and the fluctuations in them and the manner in which they are distributed over seasons or years. The possible capacity for manufacturing at the outlet I prefer not to speak about definitely to-day. It manifestly depends upon what the result of the work of the commission is. The conditions at the outlet, both as to the location of head and the fluctuation of discharge, and the effect that will be produced there by any method of handling the lake as a storage reservoir, are so thoroughly set forth in the report of the engineers of the commission that it does not seem necessary for me to say anything about them. There are two matters which, however, I think should be emphasized. The first is the quantity of storage. It seems to me that as a general proposition it can not be any too large to serve the purposes of all of the power interests involved, and it has occurred to me that it is very important to obtain all that is possible above International Falls or on the upper Rainy watershed instead of limiting it to the present volume of 100 billion cubic feet.

It seems to me that there are several benefits which would accrue by increasing this storage to the maximum amount possible. The mass curves of the engineers covering a period of 20 years show, in the first place, that frequently with, say, 150 billion cubic feet flows could have been sustained; that with a lesser quantity, say, 100 billion cubic feet could have been sustained. It has also been pointed out by Mr. Meyer that the period covered by the mass curves, limited by the data which they had to work with, does not necessarily represent the extremes of flow which may at some time occur, either the maximum or minimum flows, and he also points out that the length of the cycle of flow from low to high water periods may not be the same at



each recurrence, and it is possible that the distribution of the run-off through any cycle may vary very much from that which apparently has been covered by their work.

I believe that it may be said that as a general proposition additional storage in that upper watershed many more times than perhaps the mass curves have indicated would be of advantage to have.

It has also occurred to me that one beneficial effect of additional storage at the upper watershed will be in helping out the situation with regard to the Lake of the Woods; possibly reducing, at times at least, the difficulties in taking care of excessive outflows, and possibly at other times supplementing whatever storage is available in that lake. Then, too, it would have the effect, if Rainy Lake is raised in its height as a means of getting a part of this additional storage, of increasing the head at the plants already developed there, either permitting them to operate with a less quantity of water than at present or extending operations at that point, if experience shows that more water there is available.

The second point which it seems to me it is desirable to emphasize is with respect to the maximum level of the Lake of the Woods. It seems to me desirable, so far as regulation is concerned, to fix the maximum elevation to which the water shall ever reach at the highest possible point. There is one reason for this that I have not seen brought out, and that is the effect which it will have on solving the problems at the outlet of taking care of excess waters. As a general thing, the higher the maximum level is fixed the more effect can be produced with a given expenditure at the outlets in taking care of excess flow, or for a given effect perhaps less expenditure will be required.

Then again, if a certain range of lake levels is necessary to produce the results most desired for power purposes, the higher the maximum limit the higher the minimum limit can be established for a given range.

These are the two principal reasons that occur to me why it is advisable to raise the maximum limit as high as possible. Of course, there is the added benefit to the powers at the outlets of increasing the average head which can be utilized there, which for them at least is quite an important matter in view of the high tail-water levels which will prevail during seasons of excessive flow.

Mr. ROCKWOOD. Do I understand you to mean that raising the level increases the cross section of the existing or natural outlet without rock excavation?

Mr. FERGUSON. That is what I had in mind.

Mr. ROCKWOOD. And if rock excavation is necessary to obtain a given capacity of outflow, then the higher the level of the lake the less will be the amount of rock excavation required?

Mr. FERGUSON. I think so; yes.

Mr. ROCKWOOD. And you think that is an important consideration, as I understand you?

Mr. FERGUSON. It seems to me so, without having actually made any estimates of cost, or relative cost, of various levels. I suppose that the engineers of the commission will do so, if they have not already.

Mr. MEYER. It is in the record—about \$50,000 a foot was stated. That was the approximate figure that they had in mind.

Mr. ROCKWOOD. Will you be kind enough to speak, if you think you can add anything, of the importance of capacity of discharge at the Norman Dam or in that vicinity, for the combined purposes of regulation and power?

Mr. FERGUSON. That subject, it seems to me, Mr. Rockwood, has been so thoroughly presented by both engineers that I can add nothing to it. It must be apparent that, with the very large excess flow which it might be necessary to take care of under different methods of regulation which some time in the future might be applied, that that indeed is a very serious problem at the outlet, particularly so if the fall there is to be utilized for power or any purpose, industrial or hydraulic.

Mr. ROCKWOOD. I have no further questions, if that is all you have to say.

Mr. MAGRATH. Have you anything to add?

Mr. FERGUSON. No.

Mr. WHITE (C. E.). You heard Mr. Rockwood's statement that he read?

Mr. FERGUSON. Yes.

Mr. WHITE. In that statement he says that the total development required would be 20,000 horsepower; he also stated that there would be 200 tons of pulp per day and 250 tons of paper. Would all of that 20,000 horsepower be required for the pulp and paper manufacture?

Mr. FERGUSON. Yes, sir, it would require that amount substantially.

Mr. WHITE. How many hours per day is it customary to operate pulp and paper mills when the requirements are what might be termed normal?

Mr. FERGUSON. They ordinarily operate 24 hours continuously for six days a week.

Mr. ROCKWOOD. Now, Mr. Chairman, there is just one consideration that I wish to point out, which is, I think, fully developed in the report of the engineers and the oral statements that they have made, which I wish specifically to call attention to now, and which I may try to develop further and emphasize more fully when opportunity is given for argument in the future; and that is that method A, as described by the engineers, if adopted and followed to its full extent, as distinguished from a modification, or as a middle ground between A and B, would at times so reduce the head at the Norman Dam and at times so increase the tail water as to bring the effective head down to not more than 10 feet. Is that it, Mr. Ferguson?

Mr. FERGUSON. I think so, at times.

Mr. ROCKWOOD. And that those periods might be so great, either with that full effective, as I have described it, or an approach to it, as to make the use of this power for the contemplated purpose impracticable and uneconomic; in other words, impossible.

Mr. TAWNEY. That would occur, however, only at periods of unusual and excessive high water, would it not?

Mr. ROCKWOOD. Yes, that is true.

Mr. TAWNEY. Possibly once in thirty or forty or fifty years.

Mr. ROCKWOOD. I do not understand that they would be so far apart as that. I am not going to dwell on those. I am only calling



attention to those as a matter that we, ourselves, want to study further and present more fully.

Mr. TAWNEY. In your study, would it not be well to take into consideration the increased expenditure that would be necessary in order to secure the larger storage capacity in Rainy Lake, as an offset to the loss that might occur occasionally by reason of the increase in the level of the tail water.

Mr. ROCKWOOD. Exactly; the one bears on the other; and also another fact that bears immediately on the same question is the amount of excavation that is necessary immediately at the outlet of the Lake of the Woods and along the river between the outlet and the dam and also below the dam, to increase the capacity and lessen the possible disastrous results at the dam, with a view to power.

Mr. WYVELL. To your knowledge, no definite plans have been made for a power plant in connection with the Norman Dam to date?

Mr. FERGUSON. I only know that preliminary studies have been prepared, not by me.

Mr. WYVELL. That is as far as the plans have gone, is it not? Simply the preliminary studies?

Mr. FERGUSON. Only so far as I am aware.

Mr. WYVELL. An efficient plan could be designed, no matter what the level of the lake was fixed at, could it not—or the range of level?

Mr. FERGUSON. I do not think so, of the type that I propose here.

Mr. WYVELL. Why not?

Mr. FERGUSON. The range of levels and the maximum level are factors in determining what head is going to be available there, and how much power can be utilized for this project; the expense of development there is going to be large anyway, and unless a project of considerable magnitude can be established there, I do not think it would be commercially feasible to undertake it at all. I wish to state that I have only been connected with this project in a preliminary way, and have not had an opportunity to pass upon the plans or the preliminary studies which the company has in mind, and I can not give any very definite facts regarding the proposed developments. I can only speak in a general way.

Mr. GLENN. So far as the power below the dam is concerned, how would that be affected? Will it be high or low or uniform range? Take the power below on the Winnipeg River?

Mr. FERGUSON. The principal effect, so far as they are concerned, is that with a given minimum level, the amount of regulation and the amount of storage which could be obtained is fixed by the maximum level, and if, as a general principle, it is true that the more storage up to a reasonable limit the more perfect regulation they can get, it seems to me the maximum possible level is one of the things which should be striven for, unless it makes no difference where the minimum level is.

Mr. GLENN. So far as they are concerned, does it make any difference whether it was 1,055, or 1,057 or 1,060 or 1,062?

Mr. FERGUSON. If a certain range were determined upon, then wherever the maximum or minimum level was fixed would have no effect on them below, but if the range which can be had depends upon, we will say, the minimum limit which should be fixed on the

lake, certainly the maximum has a very great bearing from their point of view.

Mr. MIGNAULT. And would produce the best results on the Winnipeg River?

Mr. FERGUSON. If they want to get a wide range, it seems to me the maximum level is one of the factors which must be considered, and minimum level must be considered also.

Mr. WYVELL. What is the lowest head that could be developed at the Norman Dam?

Mr. FERGUSON. I do not know. My opinion is it is not much less than what ordinarily prevails there.

Mr. WYVELL. What is that?

Mr. FERGUSON. My opinion is that it is not much less than that which ordinarily prevails there. I am speaking now with reference to the project which has been described.

Mr. GLENN. Do you know what the present level there is?

Mr. FERGUSON. Not what it is at the present time; no, sir. The engineers' report shows, of course, what the prevailing head there is, or would have been during all these past years, with various rates of development; that is all shown.

Mr. WYVELL. Using your general experience as a guide, what is the most head that you have known mills to be economically developed?

Mr. FERGUSON. I have known some of the older plants operating under heads, I think, as low as 11 or 12 feet.

Mr. WYVELL. Do you know of any reason why the Norman Dam could not be economically developed with a head of 11 or 12 feet?

Mr. FERGUSON. Simply with reference to this project which has already been described, there would not be sufficient power there for that purpose. The size of the industry would have to be cut down to a point where it may possibly not be feasible to undertake it at all.

Mr. WYVELL. How much power would 13,000 cubic feet per second, falling 12 feet, produce?

Mr. FERGUSON. Approximately 14,000 horsepower with the ordinary efficiencies of say 80 per cent.

Mr. WYVELL. Do you think that a difference in the maximum of 2 or 3 feet would make any decided difference in the possibilities of designing an efficient plant?

Mr. FERGUSON. Yes, it is my impression it would; just what that effect would be expressed in definite terms I am not prepared to say.

Mr. WYVELL. Because you have not made enough study of the situation?

Mr. FERGUSON. No.

Mr. WYVELL. As a matter of fact, you have not made a decided study of the situation?

Mr. FERGUSON. Not of the layout of that particular project.

Mr. LAIRD. Referring to the power site of the power plants down the Winnipeg River and some of the questions that were put to you, as I understand, your view is that for the most efficient use of the water powers down the Winnipeg, it is desirable to have as wide a range between the maximum and minimum levels on the Lake of the Woods as possible?

Mr. FERGUSON. Up to a reasonable extent.



Mr. LAIRD. But where the maximum level and the minimum level are placed does not affect those plants below the Winnipeg River, generally speaking?

Mr. FERGUSON. The maximum and minimum levels affect the range.

Mr. LAIRD. But where those maximum and minimum levels are placed does not concern the plants, so much as the distance between them?

Mr. FERGUSON. I stated, I believe, that the range given the actual maximum or minimum level would not affect the plants below, but if it is true that as wide a range as possible is a benefit to them, then they are concerned in it.

Mr. LAIRD. And for their efficient use the wide range is desirable?

Mr. FERGUSON. Yes. The more storage that there is available for the plants below, naturally the more perfect the regulation.

Mr. GLENN. But if they could maintain a regulation between 1,055 and 1,060, would that not give them all the power they need below?

Mr. FERGUSON. I could not say as to that; I could not answer that, because that depends upon what they do need below. As I understand it, the object is to regulate in such a manner that the most efficient use of the water possible can be made, as against the time when the plants develop to the point when they will need all, and perhaps more, than the river will afford.

Mr. WYVELL. Assume the power plants below are at an elevation of 800 and also assume that they can get 16,000 cubic feet per second every day of the year, it makes no difference to them whether they get it at an elevation of 1,055 or 1,060; any elevation that is above the elevation of 800, the head of their waters, is sufficient?

Mr. FERGUSON. If the 16,000 is going to be forever sufficient for their purposes, it does not.

Mr. WYVELL. You heard Mr. Philips say that the efficient use of the water which flowed through his plant depended upon the uniformity of the flow and the amount of the water?

Mr. FERGUSON. Yes; I did.

Mr. WYVELL. You have no reason to contradict his statement?

Mr. FERGUSON. No; not the least.

Mr. BERKMAN. Can you tell me whether the statement you forwarded to Mr. Kluttz contained the list of charges on municipal and private users of power and light at International Falls?

Mr. FERGUSON. No; I do not think it does.

Mr. BERKMAN. You know what the charges were?

Mr. FERGUSON. No; I do not. The quantity of power that is used at International Falls in that way is very slight. It is a small quantity, and in comparison with the whole it is very small.

Mr. BERKMAN. We wish to introduce that evidence before we close. In regard to the objections to the introduction of Exhibit 7, that applies to Exhibits 8 and 9. There were some other papers went in with them in regard to lands.

#### TESTIMONY OF RICHARD S. LEA, OF MONTREAL.

RICHARD S. LEA, of the city of Montreal, was duly sworn and testified as follows:

Mr. CAMPBELL. You are a civil and hydraulic engineer?

Mr. LEA. I am.

Mr. CAMPBELL. Of where?

Mr. LEA. Of Montreal.

Mr. CAMPBELL. Of what experience, what length of time?

Mr. LEA. 27 or 28 years' experience.

Mr. CAMPBELL. Where have you practiced?

Mr. LEA. In Montreal and in Boston.

Mr. CAMPBELL. What are your qualifications, and with what plants or enterprises have you been connected as engineer or consulting in an advisory capacity? Mention some of them.

Mr. LEA. I am a graduate in engineering of McGill University, Montreal, and for 10 years was in charge of the department of municipal engineering, and for part of that time had charge of hydraulic laboratories and lectured on hydraulics. I am a member of the Canadian Society of Civil Engineers, the American Society of Civil Engineers, the Institution of Civil Engineers of Great Britain, and of other engineering societies. I have acted as consulting engineer in connection with hydraulic-power developments for the Ontario Hydro-Electric Power Commission & Paper Co. on the River Rouge; F. W. Bird & Son on the Jacques Cartier River; the Laurentide Paper Co.; the town of Orillia, Ontario; the Canadian Pacific Railway Co.; the Bow River developments at Kananaskie; the town of Kamloops plant, and other developments.

Mr. CAMPBELL. Still farther west?

Mr. LEA. Yes; and I was advising engineer for the principal power companies in Ottawa in connection with the apportionment of the water of the Ottawa River there for power purposes; and I made an extended investigation for the Great Lakes navigation interests of the proposed power development at the Long Sault, on the St. Lawrence River; and I have been consulting engineer for the Montreal Cotton Co. in connection with its hydraulic plant at Valleyfield, on the St. Lawrence. I have also acted as consulting engineer in connection with water supply, sewerage, power, etc., for the cities of Montreal, Ottawa, Winnipeg, Regina, Medicine Hat, Edmonton, Vancouver, and many other smaller places.

Mr. CAMPBELL. You have been pretty nearly across the continent?

Mr. LEA. Yes.

Mr. CAMPBELL. Have you made some study of the matters now before the commission in regard to the development of power at the Lake of the Woods outlet and below?

Mr. LEA. Yes.

Mr. CAMPBELL. On behalf of whom?

Mr. LEA. On behalf of the city of Winnipeg and the Winnipeg Electric Railway Co.

Mr. CAMPBELL. Have you had before you the evidence previously taken by the commission?

Mr. LEA. At the former hearings, yes.

Mr. CAMPBELL. And the text plates and tables of their consulting engineers?

Mr. LEA. Yes.

Mr. CAMPBELL. I would just like to ask you what the corps of engineers present think of that work?

Mr. LEA. Personally, as an engineer, I think it is a most excellent piece of work and wonderfully complete in every way.



Mr. CAMPBELL. And you are aware that there are five or six of the most eminent brethren of yours on the continent here; do you know what their idea about it is?

Mr. LEA. I do not think there can be any doubt about what the opinion of an engineer would be about a report that presents so much data and so much relevant information from such meagre sources.

Mr. CAMPBELL. Would you make a statement in your own way as to the amount of study you have had an opportunity to give?

Mr. LEA. Well, the information was given to me about a month ago—I mean the information derived from the commission's engineers' reports—and I also had submitted to me reports and observations made by the different engineers of the Waterpowers Branch of the Dominion Government, and later what data and information Mr. Glassco, manager of the Winnipeg Municipal Plant, and his staff could give with respect to the power situation here in Winnipeg; and similar information from the Winnipeg Electric Co.'s staff, since I came here, from Mr. Hartwell and his assistants.

Mr. CAMPBELL. Make your own statement and conclusions.

Mr. LEA. I was asked by the city and the electric railway company to examine into the question of what the effect of storage on the Lake of the Woods and its watersheds and the regulation of it would have on their interests in connection with their hydroelectric plants on the Winnipeg River, and I naturally considered the matter from the point of view of their positions as power producers in the first place and, secondly, the interest of the city in the question of relatively cheap power for ordinary city purposes—the ordinary purposes that a city requires power for—and, thirdly, the broader question of the result of cheap power on the growth and expansion of the city itself, and, of course, indirectly, on the market for power. I consider the last, in one way, the most important question, because the rapid growth of Winnipeg is due, in the first place, to its commercial position, its commanding commercial position at the gateway of the prairie country, and equally great, I think, will be its growth if power can be obtained in large quantities and cheaply enough, as a great manufacturing city; and its advantages from one circumstance would assist and add to the advantages derived from the other. All this led me to the conclusion that not only was a large quantity of power advantageous to Winnipeg, but cheap power was particularly so; and as the cost of coal is the determining factor in the operation of steam power, and as the cost of coal is high in this vicinity—a hundred per cent higher than the average in many places—this really necessitates the conclusion that steam power is to be avoided as a source of energy for Winnipeg on any considerable scale for as long a time as possible; that it, if it ever does become necessary it will be looked upon as a necessary evil, or something of that sort; but for the present, and for a long time to come, purely hydraulic power, which can be obtained on the Winnipeg River, is the desirable thing for Winnipeg.

Then coming to the plants of the city and the companies; these have been described already by Mr. Glassco and Mr. Philips and Mr. Hartwell. As has been said, the city's plant, which is a new one, is located at the highest point on the Winnipeg power reach, just

below the junction of the English River with the Winnipeg River. It includes the dams, head gates, and works of that kind necessary for its full development, as a completed power plant, and turbine equipment for something less than half its full development. At the present time the pondage above the dam, it only requires on an average 3,500 or 4,000 second-feet. It has only been three or four years in operation, and the load is growing, so that it will not be long before a much greater proportion of its development will be required. Turbines are already installed up to nearly half full capacity, and so we look forward to its complete development of something over 100,000 horsepower within a reasonably short time. When that time comes it will require for operation day in and day out, through dry periods and periods of heavy flow, about 17,000 second-feet, or with allowances for leakage through the rock fill dam, perhaps 18,000 second-feet would be required. That is for the city plant.

The Pinawa plant, as has been said, has already been developed to take care of from 6,000 to 8,000 second-feet, which can be obtained from the river without anything special in the way of storage. The other development owned by the street railway company is the one referred to as the Grand du Bonnet, which project is in its first stages. This plant is considerably larger—it is designed to be considerably larger in capacity—than the Winnipeg city plant. As far as the designs have gone at present, or rather, as far as the negotiations have gone at present, the design calls for an equipment of from 150,000 to 175,000 horsepower, which will require from 20,000 to 22,000 or 23,000 second-feet dependable flow.

These are the requirements of the plants that I studied, and the next step was, of course, to examine the situation to see where this flow was to come from. Part of the flow, of course, comes from the English River, but as this particular inquiry was directed to the Winnipeg River and the Lake of the Woods, it is that portion of the river that I wish to deal with now. The outflow from the Lake of the Woods will be controlled and depend partly on the storage on the Lake of the Woods itself, and partly on the storage on the Rainy River watershed, which is included in the Lake of the Woods watershed. I understand, from the evidence so far submitted that already there is developed on the upper Rainy watershed a storage of 100 billion cubic feet; also that by raising the level of Vermilion and other lakes, by control dams, a further storage of 50 billion cubic feet can be feasibly obtained. In that case we should like to have that 150 billion cubic feet developed, because the more storage is developed on the upper Rainy watershed, the less, everything else being equal, will be necessary on the Lake of the Woods. The total flow mentioned as being required for the Winnipeg River plant will, I imagine, necessitate a dependable outflow from the Lake of the Woods of about 10,000 to 10,500 second-feet. For the Grand du Bonnet plant 11,000 or 12,000 will be necessary for the complete operation of the proposed development. That being the case, with 150 billion cubic feet of storage on the upper Rainy watershed, we should require, with a proper manipulation of the storage, a draft or available storage capacity on the Lake of the Woods of  $6\frac{1}{2}$  or 7 feet, or more, if possible.



I also, in connection with the general interests of Winnipeg and the power situation, looked into the development of some of the other power sites on the river, all of which offer the same facilities for cheap development, and which thereby also increased the value of any storage which may be obtained on the watershed. And I find, so far as they are concerned, that the range of draft I mentioned here would be a decided advantage and tend toward an economical development of these powers.

Mr. CAMPBELL. The tables that I have here would show that you slightly understated the Winnipeg power plant requirements; you put it at 17,000 second-feet, and I make it 18,000, with 700 or 800 for losses.

Mr. LEA. Eighteen thousand?

Mr. CAMPBELL. Yes.

Mr. LEA. Well, that is instead of 17,000. The minimum should be 18,000 to 18,500 second-feet.

Mr. CAMPBELL. Then the Winnipeg Electric Co.'s proposed development is about 60 per cent to 65 per cent greater than the city of Winnipeg?

Mr. LEA. In a sense it is.

Mr. CAMPBELL. You get that power for them by making a requirement of 4,000 second-feet more, and then they have about 33½ per cent fall, have they not?

Mr. LEA. Yes; they have.

Mr. LAIRD. Have you considered the engineers' reports of suggested methods of regulations A and B, and the effect of those on the power sites below the outlet, and can you make a statement to the commission as to the comparative values and the applicability of those methods to those plants?

Mr. LEA. Yes; I have studied that, and, in view of the high price of coal and the cost of steam power, and in view of what I have already said in respect to that, it is evident, and I think it will be admitted by everybody, that for a long time to come—that is, up to the point of exhaustion of hydraulic power on the river, under method A, or somewhere about that time, method A would be preferable to any other method, where an actual method is required. My idea was that it would be some time before it would make any difference to anybody as to what particular method is employed. My idea and my opinion were that the final method of regulation should be left open for a long time, or left without any definite decision apart from whatever method might be required for the time being down the river. It is not necessary that any special method should be employed for several years, and in the meantime actual data can be obtained; I mean data based on actual measurement of inflow, run-off, etc., made for the purpose, the meteorological records, rainfall, and the rest of it, which will probably enable a much better idea to be formed of what is the best method of regulation to be finally adopted from the point of view of the use to which the power may be put.

Mr. CAMPBELL. Assume the steam power commences to be necessary as an auxiliary, as a standby, the rates and charges must increase a little?

Mr. LEA. Yes; but that seems to be looking a long distance into the future, because the power possibilities of that river are, even under method A, many times what is already being used as hydraulic power in a city the size of Montreal; so that whether steam power as a permanent auxiliary will ever become necessary, I am not able to say, of course; but at any rate when it does, naturally the rates which would be permissible under a purely hydroelectric system of generation of energy will have to be raised. Probably the effect in anticipation of raising the rates would be to check the increase in the use of power. When steam power becomes necessary, Winnipeg will be a pretty large place.

Mr. LAIRD. Referring to the two methods A and B, you think method A would be more desirable, but you think with present developments it is not wise to adopt either method?

Mr. LEA. I do not think so. There is no necessity for adopting any special method for the present, and it would be better to wait until more information is available and until it does become necessary.

Mr. LAIRD. The question has arisen as to what is desirable on the Lake of the Woods in the interests of the power developments farther down; that is, with reference to the level of the lake and the maximum and minimum. Would you make a statement with respect to that matter?

Mr. LEA. Well only so far as that level insures the 6 or 7 feet or more or range which I spoke of.

Mr. LAIRD. Explain the desirability of range from the point of view of those——

Mr. LEA. The range between high and low water required by the powers down on the Winnipeg River would only involve a maximum elevation for high water if low water were fixed at some certain minimum. So far as the actual range itself is concerned, purely and simply, of that can be obtained at one level as well as at another, it does not directly affect the requirements of the powers down the river. The proprietors of the powers might have some feeling in the matter as to which would be the better arrangement, but that would depend on the compensation which they might have to provide for the interests damaged. From that view of the case it might turn out that it would be better to fix it at one level rather than at another, but so far as the hydraulic features are concerned, it makes no difference to the powers down the river so long as you have the range that is required.

Mr. CAMPBELL. Given the same range in two sets of levels, the result to them would be the same?

Mr. LEA. Yes. Naturally, then, both would be fixed, and if the upper level were fixed, it would be a matter of some importance to see whether the lower level could feasibly——

Mr. GLENN. After examining all conditions, have you any level to recommend as the low or high level? Take what you know of the conditions there, what you know of the conditions at the dam, and so on, have you any recommendations to make as to what would be the low level?

Mr. LEA. Yes; I formed an idea from such information as I was able to get from the evidence at the former hearings, and so on, and it seemed natural that the range should be somewhere with its mean about at the required level for navigation; that would be, roughly,



evenly divided on each side of 1,059 or 1,060, which I understand to be——

Mr. CAMPBELL. That would be the mean?

Mr. LEA. Yes.

Mr. MIGNAULT. The minimum or the mean?

Mr. LEA. The mean; I thought that would be about it, merely in a general way, you know. If I had any choice as to where the range were to be, I would naturally try to accommodate myself to the other interests if possible; if not, I would pay compensation or something of that sort; but everything else being equal, I would try to accommodate the range to the navigation and other interests affected.

Mr. GLENN. But I asked for the minimum and maximum.

Mr. LEA. That would make a minimum and a maximum, respectively, with 6 feet range of somewhere about 1,056½ and 1,063, 1,056½, and 1,062½ would not be bad. I find that it requires something like that to give the flows required down the river.

Mr. GLENN. Did you hear what the old camper said yesterday?

Mr. LEA. What was that?

Mr. GLENN. That it was incumbent on you to make it as reasonable as you could on those poor fellows down there?

Mr. LEA. Well, this provides for only 6 feet range.

Mr. LAIRD. From your study of the subject, I suppose you have considered the navigation interests, which had to be considered from the point of view of navigation. The water could not be below a certain minimum in their interest; you understand that?

Mr. LEA. That is what I had in my mind, considering navigation as one of the dominant and first interests.

Mr. LAIRD. Is that a reasonable way? Is it the usual——

Mr. LEA. It is one of the usual things, to consider in a navigable waterway.

Mr. MAGRATH. Mr. Deacon has said the range might be kept within 3 feet; what do you say?

Mr. LEA. I understand that is practically impossible with outlet capacities available at the Lake of the Woods.

Mr. GLENN. How would 5 feet be?

Mr. LEA. For our purposes?

Mr. GLENN. Taking your purposes and everything else into consideration—we are trying to do justice to all parties?

Mr. LEA. We could do with more than the range I gave, but 5 feet would not give enough for the Grand du Bonnet plant. It might make quite a serious difference in the commercial feasibility of this and other undertakings if we could only depend on 5 feet. I feel that that is true.

Mr. MIGNAULT. You might make it clear that with a range as between an extreme high and an extreme low, that these two points would not be reached in any one year, but would extend, as I understand it, over a period of years.

Mr. LEA. Quite so; I would not expect the high level any oftener in that way than high level would be reached in a state of nature; that is, at long intervals.

Mr. MIGNAULT. Because the idea seems to prevail that these extreme points would be reached within, say one year?

Mr. LEA. No; the actual proportion of that range used in any one year might vary from a foot and a half to 2 feet or 3 feet or more, and very rarely indeed would the water ever come to the highest point.

Mr. MIGNAULT. That would be an absolutely extreme case?

Mr. LEA. An extreme case.

Mr. MIGNAULT. It might happen once in 25 years?

Mr. LEA. Yes, quite so; as it happens in any river, in exceptionally high floods.

Mr. POWELL. As I understand you, your idea is this; to keep the level hovering round your mean—as close to that as possible?

Mr. LEA. No; I did not have that in mind particularly, but it has actually worked out in that way, to a certain extent.

Mr. POWELL. Well, the general object would be to keep the gauge to the mean that you have given?

Mr. LEA. No; that would not be the object. The object would be to obtain that required dependable flow every day that was required, and let the level take care of itself. From the mass curves which the engineers have presented we can find out pretty well what the level would actually be under a repetition of the conditions that have existed in the last 22 years, but we would not have that particular object in view; that is, to try to keep the level of the lake at any particular elevation. The level would take care of itself, and the regulators of the outflow would be interested in delivering the required amount of water—the dependable outflow for our purposes—and in taking care of flood waters in flood time.

Mr. MIGNAULT. I thought you meant to keep it about a certain figure, and arrange matters so that it would not under any circumstances, except in flood, go beyond 1,062?

Mr. LEA. No; I explained that it did not make any difference in one sense where the range was on the lake, but if I had anything to do with it, in order to accommodate our requirements with the requirements of navigation, for instance, I would take it so that we would fulfill the requirements of navigation as far as possible while obtaining our desired flow.

Mr. MIGNAULT. As a general question, could we take it that you agree and concur in the data which have been presented by our consulting engineers?

Mr. LEA. Yes, sir.

Mr. LAIRD. You have made no independent investigation of the data which you have given? In drawing your conclusions you accept those figures and that data which they have collected?

Mr. LEA. Well, I accept the data as being the best that I thought it was possible to obtain in the circumstances; and, more than that, we have conferred with the engineers and have discussed certain points about which there might have been some misapprehension or difference of interpretation, and have cleared away all these points, to my satisfaction, at any rate.

Mr. TAWNEY. From an engineering standpoint, as I understand you, there is no difference, or very little difference, between you as to the physical data in the report or the conclusions drawn from that data by the consulting engineers?

Mr. LEA. No; except this: I was not sure when I read the report and discussed it with the engineers as to whether they had the same



preference for a method as I had, or whether they agreed with me that for a long time, or as long as it was possible, they should dispense with any particular method.

Mr. CAMPBELL. That is, between A and B?

Mr. LEA. Yes. So far as the results of using the methods A and B as to producing high water on the lake, or as to requiring a certain range, we agree as to our conclusions. I might explain that a little further. My own view at first was that method A appeared to require more flood reserve for the same effective storage range than method B, but as I studied the question further, using the engineers' data, I concluded that while this was generally true, and would be true as a general thing, it is not absolutely true, and under certain circumstances which are quite likely to occur that the method B would require as much flood reserve as method A; and I understand that this conclusion is also concurred in by Mr. Meyer and Mr. White, and with that point cleared up I could not say that there was any difference between us.

Mr. MIGNAULT. Do you advise a combination of the two methods, one method on Rainy Lake and another on the Lake of the Woods?

Mr. LEA. Well, that is one point that really requires to be cleared up. I imagine, from studying the data, that a combination might serve the interests of the power plant at International Falls and future power development on the Rainy River better to impose the same method in each case, but I do not know.

Mr. TAWNEY. Have you ever, by yourself or in conjunction with other engineers who have been consulted by various interests, given any consideration whatever to the subject of the regulation of these works, independent of such regulation as the owners of the dam and the owners of the plant might see fit to exercise? That is, independent of this, have you considered the desirability of an international board for the regulation of the works, in order to secure the most advantageous use of the waters of the lake and the waters flowing into and from the lake?

Mr. LEA. I have to a certain extent, but I am not able to give any very definite opinions as to it.

Mr. TAWNEY. Do you express an opinion as to whether or not it would be advisable to have the works recommended and constructed for the regulation of the level of the Lake of the Woods under international control, independent of the interests that are directly affected?

Mr. LEA. Well, let us see. When the range comes to be definitely settled and the question of compensation has been definitely settled, I do not see any particular necessity for that; but I see no objection to having, if there were a board, perhaps one member——

Mr. TAWNEY. An international board of two; similar to the method of regulation which the commission has provided for controlling and regulating the level of Lake Superior at the outlet of the Sault Ste. Marie?

Mr. LEA. What I mean by referring to the question of the range being settled is that the interests on the American side of the line under these circumstances would have been completely dealt with, and the power interests on the Canadian side of the line would be always in process of being dealt with by this particular board; so that, from

that point of view, the Canadian interests would be greater. But I see no particular objection—I see none at all—if the board were confined to two members, as suggested.

Mr. TAWNEY. At the present time there is a system of regulation on the Lake of the Woods by reason of certain interests desiring to have as large a head at Kenora as possible; the waters at flood time on the lake rise very rapidly to rather a high stage; that has caused considerable trouble, and it has also been difficult for the people on our side of the line to have the regulation or the dam so adjusted as to prevent damage on our side of the line. Would it not be more likely to give satisfaction on both sides if the control and regulation of the works were under control of an international body entirely independent of those who would be benefited by the increased head?

Mr. LEA. There now occurs to my mind the idea that, at any rate, until some final method of regulation is imposed, that would perhaps be necessary, because up to that time the efforts of the board would be directed toward devising a method which would keep the lake levels within range; so that the interests on both sides of the line would need representation and protection on the board.

Mr. TAWNEY. There is no question that the American interest in the Lake of the Woods does need some protection of that kind.

Mr. LEA. But once the point was settled as to riparian damages, it seems to me the whole question is one of power, and I do not see any particular reason why the Canadian or American interests would require representation.

Mr. TAWNEY. Not if the works were so regulated as to keep the level within the range fixed?

Mr. LEA. That would be at a time when it would be demonstrated that such regulation could really be done; but I think the power interests ought to be the dominant party in the matter of regulation, because the consequence would be so very serious when hundreds of thousands of horsepower are concerned.

Mr. CAMPBELL. You mean regulation by inches within the limit; the power interests should not have the power of regulating and getting it up above or away down below the limit?

Mr. LEA. I hardly meant that. I mean that the power interests are the ones most vitally concerned in the regulation of the lake, and any damage that would occur to them through a mistake would be fifty or a hundred times greater than would occur to anybody else; so that from that point of view I imagine the power interests should be represented on the board rather to the exclusion of any other separate interest.

Mr. GLENN. In making your statement, you have made it from that standpoint?

Mr. LEA. No, I do not go so far as that.

Mr. GLENN. Do you take into consideration the navigation, fisheries and agricultural interests as well? All those interests were submitted to us, and I suppose the engineers we have employed have had that in view?

Mr. LEA. Yes.

Mr. GLENN. Have you taken all those things into consideration?

Mr. LEA. I took first into consideration the requirements of the plants I had in view, and then I considered the other interests only



with reference to adjusting these requirements to them as nearly as possible. In connection with that, I think I may repeat that some of those plants may require, in order to make them commercially feasible in comparison with some of the others, that a range of 6½ feet or 7 feet at least should be available for storage on the Lake of the Woods.

Mr. POWELL. Speaking, about joint control, we fix limited; then after that there is a great sphere for the exercise of judgment when, in anticipation of a wet time to begin to increase the outflow at Kenora, because if it was kept up too long it would exceed the limit. Within that range there would be room for the exercise of very intelligent and almost technical jurisdiction. Now it would strike one as being fair that that matter should be under the control of that international board?

Mr. LEA. Yes, that is what I thought was proper.

Mr. POWELL. We had that at Lake Superior, at the Sault, and we had it down at St. Croix in New Brunswick. In other words, where the two countries were interested they should be represented in the control; that is a matter of fair play.

Mr. LEA. Yes, and it will be easy at first to comply with the requirements down the river, because they are at present so slight, and that would give the board time to learn how to regulate so as to keep the levels within the range and safeguard everybody's interest.

Mr. MIGNAULT. I think you have made clear in your consideration of the subject that the riparian owners should be compensated, or would be compensated, for any damage which might be done to them by any change of levels in the lake.

Mr. LEA. Oh, absolutely; that was taken into account always.

Mr. CAMPBELL. I think that is all.

Mr. WYVELL. Suppose we speak of ordinary drafts; ordinarily, would not a draft of 5 feet be sufficient?

Mr. LEA. That would depend on the storage available on the upper Rainy watershed, to start with.

Mr. WYVELL. The engineers have been using 5 feet as the amount of draft, or the sum total of draft, necessary to take care of the storage, and as I understand it, they meant that the height of the lake be established at the maximum which would ordinarily prevail, that there should be then a minimum 5 feet lower than that which would ordinarily prevail; don't you regard that as a reasonable proposition?

Mr. LEA. I think that that use of the storage was only a tentative use and only used as an illustration.

Mr. WYVELL. You favor even a greater draft, using the term ordinarily?

Mr. LEA. Yes, if possible.

Mr. WYVELL. Do you know what the fall is between the Lake of the Woods and the mouth of the Winnipeg River?

Mr. LEA. Yes; 290 feet, I think.

Mr. WYVELL. Two hundred and ninety-one, it is stated.

Mr. LEA. Meaning by that the fall available for power.

Mr. MIGNAULT. The fall is greater than that.

Mr. LEA. Yes.

Mr. WYVELL. Assuming an average flow from the Lake of the Woods of 16,000 cubic feet per second, do you know how much power can be developed with this water below the outlet of the lake?

Mr. LEA. 16,000 second-feet?

Mr. WYVELL. Yes.

Mr. LEA. At 80 per cent efficiency which has been used, every second-foot will produce about 26.4 horsepower, and 16,000 times that is the answer to your question.

Mr. CAMPBELL. That is 425,000.

Mr. WYVELL. Substantially 400,000 horsepower.

Mr. LEA. Yes.

Mr. WYVELL. With what you know or have learned, about how much power can be developed with this same flow; how much power can be developed with 16,000 second-feet flow at the outlet of the lake?

Mr. LEA. That would depend on the height and range that was adopted, and the storage, and the capacity of the outlets there.

Mr. WYVELL. I think it was stated that about 25,000 horsepower could be developed there, was it not?

Mr. LEA. Well, it might be anything.

Mr. WYVELL. I mean, assuming 16,000 second-feet?

Mr. LEA. At 16,000 second-feet, with 17 or 18 feet fall, it would produce that many horsepower.

Mr. WYVELL. The relative importance of the powers below the outlet and the powers at the outlet is about 16 to 1?

Mr. LEA. When they are all developed; yes.

Mr. GLENN. And your range is about the same as the Government engineer; your range is 5 feet plus the water stored up there; and is there not 5 feet without that? Is that not about the same?

Mr. LEA. If we both started with 5 feet effective range, I think it is about the same.

Mr. GLENN. Yours is 5 feet plus?

Mr. LEA. Yes; with an effective range of  $6\frac{1}{2}$  feet, if it is possible, after the engineers have studied how to regulate——

Mr. GLENN. Take their 5 feet plus the reserve storage up there; would that not make about 6 or  $6\frac{1}{2}$  or 7?

Mr. LEA. Yes.

Mr. GLENN. So that you are not so far apart after all?

Mr. LEA. No; that is correct.

Mr. WYVELL. At times of high discharge at the outlet of the Lake of the Woods, the amount of power that can be developed at or near the outlets would be decreased, of course, a great deal, would it not?

Mr. LEA. Probably; yes.

Mr. WYVELL. And then the relative importance of the power development on the lower river would be still greater than the ratio of 17 to 1?

Mr. LEA. I do not know. I think they could keep the power the same if they wanted to. They might put in an additional low-head equipment and use it when they had lots of water——

Mr. WYVELL. They might arrange to use the low head at that time——

Mr. LEA. At a time when there was plenty of water and low head.

Mr. WYVELL. The power below the point where the English River reaches the Winnipeg River, they get the benefit of the English River flow?



Mr. LEA. Yes; but that has been included in my estimate. I did not mean when this 18,000 second-feet was necessary that it was all to come from the Lake of the Woods. I was figuring that some of it would come from the English River when that river was developed in the same way.

Mr. WYVELL. But when you take into consideration the water which may come from the English River, the relative importance of the power sites, it is even greater than the ratio of 17 to 1?

Mr. LEA. Yes; the way you estimate.

Mr. WYVELL. Considering the Lake of the Woods waters alone, the only reason the ratio of importance of power developments below the outlets bear to power developments at the outlet at or near Kenora is that by installing at or near the outlets lower head power developments, that you may get the benefit of all the head?

Mr. LEA. You may get the benefit of the higher flow, so as to preserve the power at the outlet the same at all times and not diminish it, as you suggested during periods of diminished heads.

Mr. WYVELL. Assuming that the needs of navigation can be taken care of at an elevation of 1,054 or 1,055, then you would not make any difference? I mean the minimum level in your mind might as well be that sum as any other sum, might it not?

Mr. LEA. If it did not affect the question in a monetary way—in the way of damages—yes.

Mr. LAIRD. I omitted to ask Mr. Hartwell, and perhaps you can give me the information, as to the cost of developing the Grand du Bonnet site. Could you tell us approximately the cost of developing the plant of the Winnipeg River Power Co. at Grand Falls or Grand du Bonnet?

Mr. LEA. I understand it is somewhere in the vicinity of \$7,000,000.

Mr. MAGRATH. Are there any other witnesses to be heard?

Mr. CAMPBELL. I have no more, Mr. Chairman.

Mr. MAGRATH. Mr. Wilson, have you any testimony to offer?

Mr. WILSON. Yes. I have here a statement, Mr. Chairman, showing practically what I think is already in the record. The statement is in connection with the investment of the Lake of the Woods Milling Co. and the power it uses. The general manager of the company is here prepared to verify it.

Mr. TAWNEY. You might have him verify it, Mr. Wilson, and it can be presented for the record.

#### TESTIMONY OF MR. WILLIAM A. MATHESON, OF WINNIPEG, CANADA.

WILLIAM A. MATHESON, after being duly sworn, testified as follows:

Mr. WILSON. Mr. Matheson, you are the general manager of the Lake of the Woods Milling Co.?

Mr. MATHESON. Yes, sir.

Mr. POWELL. Is your statement, Mr. Wilson, limited simply to your mills?

Mr. WILSON. Yes, sir; to the mills and the barrel factory that is connected with them.

Mr. POWELL. When we were at Kenora somebody undertook to get a complete statement of the capital invested in the different industries there.

Mr. WILSON. That is the purpose of this statement.

Mr. POWELL. But that is only a portion of the industries. There are other industries than the Lake of the Woods milling establishment. Some one promised to give us a comprehensive statement of all the industries at the foot of the lake.

Mr. TAWNEY. That information has not been furnished.

Mr. WILSON. It was not I who promised that, sir. Mr. Matheson, do you verify the statement that I now show you?

Mr. MATHESON. I do.

(The statement verified by the witness is copied into the record in full as follows:)

WINNIPEG, CANADA, *February 3, 1916.*

The INTERNATIONAL JOINT COMMISSION,  
*City.*

GENTLEMEN: We give below valuation of Lake of the Woods Milling Co.'s property in Keewatin:

Mill C-----	\$1, 164, 000
Mill A-----	1, 980, 000
	<hr/> 3, 144, 000

(This valuation includes barrel factory, office building, and storehouses.)

Average number of men employed at the mills and barrel factory, about-----	350
Average yearly pay roll, about-----	\$250, 000
Daily output for 1914-1915-----barrels--	7, 500-9, 000
Value of products manufactured, 1914-1915, about-----	\$15, 000, 000

At present we are using from 3,400 to 3,700 horsepower. Are installing machinery to increase output of Mill A approximately 1,000 barrels, which will make the total capacity of Mill A 5,000 barrels and of both mills 10,000 barrels per day.

We expect to further increase the mills from time to time to use our full installed horsepower of 5,700.

Yours, truly,

LAKE OF THE WOODS MILLING Co. (LTD.),  
W. A. MATHESON, *General Manager.*

Mr. WILSON. I think Mr. Matheson also desires to say something with respect to statements made by some of the witnesses here that the milling industry did not intend to extend at Keewatin, but intended to go west and put up their mills on the prairies. At any rate, the directors have not heard of that or considered it. That is correct, is it not, Mr. Matheson?

Mr. MATHESON. That is correct.

Mr. WYVELL. How many cubic feet per second are you using on an average now there?

Mr. MATHESON. I do not think I should attempt to answer that question.

Mr. WYVELL. You spoke of the years being from 1914 to 1915. Is that your business year from June 30 of one year to June 30 of the next year?

Mr. MATHESON. From September.

Mr. MAGRATH. Is there anyone here representing the town of Kenora?



Mr. KEEFER. Yes, sir. I would state that I received a letter asking me, in the absence of their town solicitor, to look after their interests. The mayor and the engineer have been here, but they decided that inasmuch as Mr. Acres is here they would leave him to present their case. He can do so now if you wish.

Mr. TAWNEY. We have heard Kenora.

Mr. KEEFER. It is just on the one question of what level is required so far as their plant is concerned.

Mr. TAWNEY. We asked for and they promised to furnish the commission with a statement showing the aggregate value of all plants and the investments of various interests at Kenora, the milling industry, the lumber industry, the value of docks and everything else, so we could get some idea of the amount of money the people in that vicinity have invested in the use of these waters. It was first called for three years ago.

Mr. KEEFER. I will endeavor to see that the information is furnished you.

#### TESTIMONY OF MR. H. G. ACRES, OF TORONTO, CANADA.

H. G. ACRES, after being duly sworn, testified as follows:

Mr. KEEFER. Mr. Acres, you are the hydraulic engineer of the hydroelectric commission of the Province of Ontario?

Mr. ACRES. Yes, sir.

Mr. KEEFER. The mayor of Kenora asked you to present their views to the commission showing how the question of levels would affect their development plant at what we call, I think, the eastern outlet. Will you kindly do so?

Mr. ACRES. The municipal plant at the town of Kenora was originally designed for a normal head of approximately 17 feet, and the possible injury arising from any order which the commission may make is due to the fact that a range higher than 1,063 will affect the stability of their works, and that a range lower than possibly 1,058 will begin to cause trouble in the matter of reducing the capacity of their wheels. While this injury would be caused under such conditions, the town does not wish to go on record as objecting to any extension of the range below the point mentioned, although, of course, an extension of the range above 1,063 would be very serious. They merely wish to point out that if any specified lower level than 1,058 were to be obtained, they would consider any injury to their plant due to that lower level would render them entitled to some measure of redress. 1,063 is the extreme maximum level that the plant as now constructed can stand without risk as to the stability of the works in their proper operation.

Mr. KEEFER. Is there anything else that you recall that they wish you to present?

Mr. ACRES. Merely the fact that they appreciate that the town's interest in the matter is based on a much broader issue than any possible injury to their plant.

Mr. KEEFER. Will you kindly explain that?

Mr. ACRES. Simply that the best use of the Lake of the Woods, for the various purposes of navigation, power, etc., will reflect upon the

prosperity of the town, and they do not wish to be understood as putting the question of possible injury to their plant as against the realization of those possible benefits.

Mr. KEEFER. I think at the Kenora sittings they gave us some idea of what their desires in that respect were. Is there any way that compensation could be provided, other than by money, if you had to go below 1,058?

Mr. ACRES. Yes; there are two possible ways.

Mr. KEEFER. What are they?

Mr. ACRES. One method is purely local, and that is by putting baffle plates over the wheels, in order to protect the wheels from vortex effect. The other way is the possible means of relieving the whole tail-water situation at Kenora by enlarging the channel at The Dalles and Throat Rapids.

Mr. POWELL. Do you suggest any maximum height?

Mr. ACRES. Yes, sir.

Mr. KEEFER. Pardon me, Mr. Powell, you are going to get that in the regular way. I do not wish to interfere, but we have sort of outlined a sequence of receiving the evidence of both the Province of Ontario and the Government, and I am only calling Mr. Acres here to speak about the town of Kenora. He will be recalled with respect to the Province of Ontario. Mr. Acres, is there anything else with relation to the town of Kenora that the commission should know about?

Mr. ACRES. No, sir.

Mr. ANDERSON. Mr. Chairman, Mr. Stevens, of the Public Works Department of the Dominion of Canada, is here. He wants to make a statement with reference to the situation on Rainy Lake, particularly with reference to the bridges, etc.

### TESTIMONY OF MR. ALFRED J. STEVENS, OF WINNIPEG, CANADA.

ALFRED J. STEVENS, after being duly sworn, testified as follows:

Mr. ANDERSON. What is your occupation, Mr. Stevens?

Mr. STEVENS. Civil engineer.

Mr. ANDERSON. In the employ of the department of public works?

Mr. STEVENS. The Dominion Government, department of public works.

Mr. ANDERSON. You occupy what position here?

Mr. STEVENS. Acting district engineer.

Mr. ANDERSON. Do you want to make some statement to the commission with reference to the situation on Rainy Lake from a navigation standpoint, and particularly with reference to the bridges and trestlework of the Canadian Northern Railway?

Mr. STEVENS. The protection of navigable waterways comes under the control of our department, and in 1910 the Canadian Northern Railway made application to our department to have the openings in their proposed embankment across Rainy River defined as to the number and the length of openings, so that when they prepared final plans and submitted them for approval they would likely meet the requirements of the department. I went down in 1910 and met the lumber interests there.



MR. ANDERSON. You might state briefly what was done so far as your department insisted on any regulation, or suggested any regulation.

MR. STEVENS. As a result of my visit there we asked the Canadian Northern Railway to provide a log pass of 120 feet clear span west of Island No. 1. That was an island marked on their plans as submitted. That is near the west side of their embankment. On the east side of Island No. 1 there was to be a navigable opening of 80 feet clear span. Over this they were to erect a bastile lift bridge.

MR. ANDERSON. Was there any limitation as to the height or the clearance?

MR. STEVENS. The plans submitted afterwards showed a clearance of about 5 feet above the water when at elevation 497 of the power company's datum.

MR. ANDERSON. Would the raising of the level of Rainy Lake affect that clearance in any way?

MR. STEVENS. It would materially reduce the clearance. That 5 feet is under the bastile lift bridge. Under the log pass the clearance was greater.

MR. ANDERSON. How much was the clearance under the log pass?

MR. STEVENS. I think it was about  $8\frac{1}{2}$  feet.

MR. ANDERSON. Is there any particular clearance that your department insists upon?

MR. STEVENS. We have the approval of the general plans, and we keep the bridges high enough so that small boats can pass under safely. For instance, a motor boat approaching a span in the embankment might not be able to give a signal that it wants to go through, and, ordinarily, the bridge should be high enough above the water to allow small boats to pass through safely.

MR. ANDERSON. At any rate, that is the clearance you require in connection with those openings?

MR. STEVENS. Yes.

MR. ANDERSON. If the levels of the lake were raised any more, what would be the result so far as your department is concerned?

MR. STEVENS. It would seriously interfere with navigation, and the questions would certainly be submitted to the department for approval.

MR. ANDERSON. In other words, it might involve some change——

MR. STEVENS. In the design of the structure.

MR. ANDERSON. Is that all you want to say?

MR. STEVENS. At Bears Pass, at a point about 10 or 15 miles east of that, there are two other bridges of a somewhat similar nature. The log pass is about 80-foot span, I think, and the navigable opening about 50 feet. These two are erected close together, and the same conditions hold there as at any other place; about the same clearance.

MR. ROCKWOOD. Mr. Stevens, these bridges were actually erected as your department required, were they not?

MR. STEVENS. I think so. At the time I went down there in 1910 the Rainy Lake district was under the Manitoba district. Since then it was removed and made a part of another district, but I was the one that went there and specified the openings necessary at the time, and I think we had the approval of the plans in our office, but the inspection of it afterwards I think came under another department.

Mr. ROCKWOOD. As I understood you, you stated that if the public interest required the raising of the waters of the lake above 497, the hindrance to navigation could be overcome by modifying the bridges?

Mr. STEVENS. That might be possible. It would probably be an expensive matter, though. It would probably involve a reconstruction of the piers and retaining walls. It is a question of deciding from an engineering viewpoint whether that would have to be done.

Mr. GLENN. Have you not seen it higher than 497 at that place?

Mr. STEVENS. No, sir; I never saw the place but once, and I think it was below 497.

#### TESTIMONY OF MR. H. G. ACRES, OF TORONTO, CANADA—Continued.

H. G. ACRES, who had previously testified, being recalled on behalf of the Province of Ontario, continued his testimony as follows:

Mr. KEEFER. Mr. Acres, you previously stated your official position in connection with the Hydroelectric Commission of the Province of Ontario. In that capacity have you had considerable to do with the study of the Lake of the Woods levels question?

Mr. ACRES. Yes, sir.

Mr. KEEFER. As a result of that consideration and conference with your other engineers, just briefly state to the commission, in your own way, what your views are. Take, for instance, the question of range.

Mr. ACRES. The first consideration, of course, is the matter of range, and in that connection we have a specific proposal to make, namely, that the extreme maximum range be 1,062.5, and that the minimum range be, I would say, 1,056 to 1,056.5, depending upon what future conditions will indicate as being feasible or best in the general interest.

To be more specific in the matter of the absolute fixing of the maximum level, I might say that we consider one point of justification is the fact that 1,062.5 is the maximum authentic recorded elevation of the natural maximum in the Lake of the Woods. The second consideration is that we are obliged to handle flood flows larger than would otherwise be necessary, owing to the fact that Rainy Lake can not be used for holding flood flows back of International Falls, due to the fact that the vested interests there require some consideration.

Any method of general regulation on the entire watershed which would be reasonably favorable to those interests involves the handling of practically all the flood flow from Rainy Lake and from the Lake of the Woods itself, at the outlets of the Lake of the Woods. That entails the handling, as I said before, of larger quantities of flood flow out of the Lake of the Woods than would otherwise be necessary if the whole water system from the Lake of the Woods up to Rainy Lake and along the international boundary could be regulated entirely for storage purposes.

I do not wish any of the interests here to think that I am making a statement in opposition to any benefit they might derive from works at the outlets of the Lake of the Woods. It is merely a statement of fact that the interests at International Falls are such that the



flood flows at the openings of the Lake of the Woods would of necessity be of such magnitude that there will probably be a greater than natural reduction of head during the period of passing the same, and that is one of the main and primary reasons for the reduction of the head at the opening of the Lake of the Woods.

Mr. KEEFER. What was your reason for taking the minimum point of level?

Mr. ACRES. It appears that the proper view of the matter, in view of the interests involved, necessitates the consideration of an over-all range of 6 feet on the Lake of the Woods. That involves the consideration, of course, of a minimum level in the neighborhood of 1,056 or 1,056.5, depending, of course, upon the setting of a maximum level of 1,062.5.

Mr. KEEFER. Can you roughly state between those ranges what the level of the lake would be for the greater portion of the time, and what portion of the time that level would maintain? If you adopted that range what would the average be?

Mr. ACRES. I should imagine that the best way to express that would be to say that under a proper method of regulation, when the Lake of the Woods reached an elevation of possibly 1,061, on a rising stage, the regulating works should be opened to pass the maximum flood flow that they are capable of passing. I mentioned 1,061 more by way of an illustration than as a definite figure for the elevation when it will be necessary to open the works. That is a matter which would require trial to be ascertained more accurately by the operation of any works that are constructed in connection with the storage scheme.

Mr. KEEFER. During what portion of the year would the water be round about the 1,061 level, or within 6 inches of it?

Mr. ACRES. I do not wish to make a statement of that kind from memory. I think possibly that the consulting engineers of the commission could give that information more specifically from their records. I am quite willing to accept their judgment in that matter.

Mr. KEEFER. By the way, on the question of the work of the consulting engineers, so far as representing the Province of Ontario is concerned, what have you to say respecting their data and the physical features, if any, they have gathered from which to draw deductions?

Mr. ACRES. To the best of my knowledge, they have gathered and coordinated practically all of the physical data which were available in connection with the investigation of the question, and, as to their manner of presenting the data and their conclusions, I can not see that there is any fault to be found.

Mr. KEEFER. You concur in their conclusions?

Mr. ACRES. I think so in almost every particular.

Mr. KEEFER. You speak in that way as the representative of the Province of Ontario?

Mr. ACRES. I do; yes, sir.

Mr. KEEFER. The Province of Ontario, I believe, has water-power ownership on the Winnipeg River still vested in the Crown?

Mr. ACRES. Yes, sir.

Mr. KEEFER. State where that is and its extent.

Mr. ACRES. That is the natural water power commonly known as White Dog Rapids, which is situated on the lower reach of the

Winnipeg River some miles above its junction with the English River. The main fact to be brought out in connection with this water power is that it is dependent altogether for its usefulness and its commercial importance upon the regulation of the waters of the Lake of the Woods.

Mr. KEEFER. It has no other water passing over it?

Mr. ACRES. No; none whatever.

Mr. KEEFER. Give the drop and the possible development there.

Mr. ACRES. There is a possibility of developing a head of about 45 feet, and, of course, the amount of power which can be developed under that head is, roughly, directly in proportion to the utilizable flow which can be obtained from the Lake of the Woods.

Mr. KEEFER. Then, I presume it is a correct statement to make to the commission that, quite in addition to the interests that the Province has in other respects, this power is an important matter to them, and the regulation of Lake of the Woods is of great importance?

Mr. ACRES. The White Dog Rapids water power is one of the most important powers still remaining vested in the Crown as represented by the Province of Ontario.

Mr. KEEFER. And the water powers are represented by your commission, the hydroelectric commission?

Mr. ACRES. Yes, sir.

Mr. KEEFER. I beg your pardon for interrupting you. You may proceed now with what you were about to say.

Mr. ACRES. I was merely going to say that it is among the very largest of what might be called the inland water powers of the Province as distinguished from the water powers on the boundary rivers.

Mr. TAWNEY. Is there any demand for that power now existing that would justify its development?

Mr. ACRES. Not at the moment, sir. Its potential importance is due largely to the fact that it is a very short distance from the main line of the transcontinental railway, and it has a large tributary watershed which might in the future make it an important site for pulp and paper manufacture, or possibly for atmospheric products.

Mr. KEEFER. Speaking for the information of the gentlemen of the commission, the main line of the transcontinental railway was put in operation when, roughly speaking?

Mr. ACRES. It has been hardly more than a year, I think.

Mr. KEEFER. So that its potentiality has really just come in force in the last 12 months.

Mr. TAWNEY. Is that line operated electrically?

Mr. KEEFER. No; it is what we commonly speak of as the Grand Trunk Pacific, a newly built transcontinental steam road. It was built by the Government.

Mr. TAWNEY. In what respect has this road increased the value of the power?

Mr. ACRES. Your suggestion, Mr. Tawney, is worth mentioning. The White Dog Rapids water power is a water power which has sufficient capacity to make it well worth considering as a source of power for railroad electrification. If there is any proposition to electrify the railway, it would undoubtedly be one of the plants that would be linked up in connection with the electric operation of that



road. Apart from that fact, the influence of the transcontinental railway upon the commercial importance of that power is considerable.

MR. KEEFER. I think the commission has full evidence about all the powers at the outlets.

MR. TAWNEY. That was covered very fully at Kenora last September.

MR. MIGNAULT. Mr. Keefer, possibly you have already given this information, but if so I was probably out of the room at the time. What is the position of the Hydroelectric Commission in the Province of Ontario?

MR. KEEFER. I think I will allow Mr. Acres to answer that. I did state it very briefly. It is the body to whom by law is given the management and control of all water powers in the Province. Mr. Acres can state it better than I can.

MR. MIGNAULT. I know it is a question you can hardly answer generally, but to whom do the unappropriated water powers in the Province of Ontario belong?

MR. KEEFER. To the Crown. The jurisdiction of that is exercised by the Hydroelectric Commission under the authority of the department of lands and mines. Through their staff of engineers the entire management of all of our water powers now in the Province of Ontario is in the Hydroelectric Commission, under the above authority, and the ownership is in the Crown.

MR. MIGNAULT. Did Mr. Acres state—if he did so it will not be necessary to repeat it—what are the water powers on the Winnipeg River in which the title is in the crown?

MR. KEEFER. He stated that. It is the one at White Dog Rapids. He gave the dimensions and all the details. That is the only one that the Province of Ontario has there.

MR. MIGNAULT. As to the water powers in the Province of Manitoba—

MR. KEEFER. That will be followed up by Mr. Anderson.

MR. TAWNEY. We covered that in the hearings three years ago last September.

MR. KEEFER. It will be more fully elaborated to you by Mr. Chalkies, superintendent of the branch that has charge of that, and some of the engineers.

MR. WYVELL. Mr. Acres, while 1,062.5 may be highest level ever reached, it is true, is it not, that the best information available indicates that this level was reached very rarely?

MR. ACRES. Yes, sir; and it still will be reached rarely, in my opinion.

MR. WYVELL. With a minimum regulated level of 1,056.5, how often do you think the level of 1,062.5 will be reached?

MR. ACRES. I think that that question could best be answered. Mr. Wyvell, by inspecting the records of the consulting engineers, which I am willing to abide by.

MR. WYVELL. I mean under good regulation.

MR. ACRES. I think I would still have to answer the question in that way.

MR. WYVELL. Basing it upon the regulation in the past 21 years?

MR. ACRES. That is all the data we have to go on at the present time.

Mr. WYVELL. You spoke with reference to the White Dog Rapids. The fall there I think you gave as about 40 feet.

Mr. ACRES. Forty-five feet.

Mr. WYVELL. The efficiency of the use of the water at White Dog Rapids depends entirely upon the amount and uniformity of the flow there, does it not?

Mr. ACRES. Yes.

Mr. WYVELL. If a range of levels on the Lake of the Woods is established so that sufficient water may be stored, as a result of which the best practicable uniformity of flow is secured at White Dog Rapids, it is immaterial what the maximum level of the Lake of the Woods is, so far as the efficient use of the water at White Dog Rapids is concerned?

Mr. ACRES. No, it is not; not if you consider the question of compensation.

Mr. WYVELL. I mean the use of the water considering it from the viewpoint of the efficient use of the water at White Dog Rapids.

Mr. ACRES. From the standpoint of efficient use, I should say it was. That is theoretical.

Mr. WYVELL. Why, then, did you set your maximum level at 1,062.5 and provide 6 feet for your range? Why not set your maximum level at 1,059?

Mr. ACRES. The extreme maximum level at 1,059?

Mr. WYVELL. I will say the ordinary high level of 1,059.

Mr. KEEFER. Let us make ourselves clear. We are talking about a maximum level and not an ordinary level.

Mr. WYVELL. We will say an extreme maximum level of 1,060.6.

Mr. ACRES. I can not answer that question any more specifically than by repeating what I said before, that in the operation of levels like that, when the lake reached an elevation of possibly 1,061 on a rising stage it would begin to discharge its flood flow. That is really all that amounts to.

Mr. WYVELL. Why did you assume 1,062.5 as the extreme maximum stage of the water? Why not make it 1,060?

Mr. ACRES. And still have in mind the same range?

Mr. WYVELL. Yes; the same range exactly.

Mr. ACRES. A range of 6 to  $6\frac{1}{2}$  feet. That is at least a minimum level as low as 1,054. For one thing, the plants at the outlets of the Lake of the Woods have been operating for a number of years and have understood that they were operating under practically assured and normal conditions based on a level of, roughly, 1,060. If you apply that range of 6 feet to what you might roughly call a mean stage of 1,060, you have got something like what I mentioned, 1,062.5 and 1,056.5. If you apply that same line of reasoning to an extreme maximum of 1,060, the navigation conditions on the Lake of the Woods are likely at times to be rather acute, I should imagine.

Mr. WYVELL. You took other things into consideration than the question of power in arriving at that?

Mr. ACRES. I represent Ontario officially. Of course, Ontario is interested not only in power, but in navigation and fishing. That range and those specified limits of range which I have mentioned are mentioned after giving due consideration to all the interests involved and after giving what was considered proper weight to the interests.



Mr. KEEFER. There has been considerable deliberation upon that point, Mr. Acres, I suppose?

Mr. ACRES. Yes, sir; most decidedly.

### TESTIMONY OF MR. J. B. CHALLIES, OF OTTAWA, CANADA.

J. B. CHALLIES, after being duly sworn, testified as follows:

Mr. ANDERSON. What governmental department do you preside over, Mr. Challies?

Mr. CHALLIES. The Dominion water power branch of the department of the interior.

Mr. ANDERSON. What is your technical title?

Mr. CHALLIES. I am superintendent of that branch.

Mr. ANDERSON. The water powers branch is administered under the department of the interior?

Mr. CHALLIES. Yes, sir.

Mr. ANDERSON. What interest has your department in the undisposed of or undeveloped water powers on the Winnipeg River?

Mr. CHALLIES. We have a proprietary interest in those undeveloped water powers.

Mr. ANDERSON. The Dominion Government claims a proprietary interest in undeveloped water powers?

Mr. CHALLIES. Yes.

Mr. ANDERSON. How many potential powers are there upon the Winnipeg River, developed and undeveloped?

Mr. CHALLIES. There are nine water-power sites on the river in Manitoba. Two of those are developed.

Mr. ANDERSON. That leaves seven undeveloped?

Mr. CHALLIES. Yes; one is about to be developed, that of the Winnipeg River Power Co.

Mr. ANDERSON. The two developed powers are those of the Winnipeg Electric and the city of Winnipeg?

Mr. CHALLIES. Yes.

Mr. ANDERSON. Then the Winnipeg River Power Co. has a concession to develop the Grand du Bonnet Falls?

Mr. CHALLIES. Yes.

Mr. ANDERSON. To what extent do you consider that your department is interested in the regulation and the control of the water supply in the Winnipeg River?

Mr. CHALLIES. We are interested in this way, sir: That these water powers on the Winnipeg River in Manitoba are dependent on the flow in that river, and that flow comes from the Lake of the Woods. I presume your question applies to the Lake of the Woods?

Mr. ANDERSON. Yes.

Mr. CHALLIES. Therefore we are interested in getting that maximum possible regulation out of that lake.

Mr. ANDERSON. How long have you been superintendent of water powers?

Mr. CHALLIES. Five years.

Mr. ANDERSON. During that time have you made many surveys and gathered much information with reference to the situation on the Winnipeg River?

Mr. CHALLIES. Both since that time and for about three years before I have been in charge of surveys on this river, primarily in connection with the water powers of the river in Manitoba.

Mr. ANDERSON. I suppose that you have supplied the engineers of the commission with all the data or information in your possession?

Mr. CHALLIES. Practically everything; yes.

Mr. ANDERSON. In dealing with the powers and the purposes of power on the Winnipeg River, what is your policy with reference to the ultimate development? I mean as to the maximum development and how it is to be obtained.

Mr. CHALLIES. That policy, sir, is set out in our water power regulations, which are pursuant to an act of Parliament. In short, the policy of the department of the interior is to insist upon the most advantageous possible use of the natural advantages of a power site. If we are considering the strength of a river like that in Manitoba, which consists of a number of separate waterfalls, it is the policy of the department to see that those several waterfalls are concentrated and used to the best possible advantage.

Mr. ANDERSON. In keeping with that policy or in the administration of that policy, what relation has the regulation to the supply of the water? What position does it occupy?

Mr. CHALLIES. I do not just understand your question.

Mr. ANDERSON. You say you want each site developed to its utmost capacity, and that is one of the things you insist on. You insist on plans being submitted to you by people who want to develop the power. You have got to approve those plans before they are allowed to build, have you not?

Mr. CHALLIES. Yes, sir.

Mr. ANDERSON. What I mean is this: Are those plans approved or passed upon by you, having in view only the unregulated flow of the river or the possible complete utilization of all the waters that you may be able to get in the river?

Mr. CHALLIES. Yes.

Mr. ANDERSON. Which is it?

Mr. CHALLIES. They have in view a development which will realize the maximum use of all available flow.

Mr. ANDERSON. How is that development to be obtained? I mean, how will you get the maximum flow and a continuous flow?

Mr. CHALLIES. That can only be obtained by regulation on the Lake of the Woods.

Mr. ANDERSON. What is your opinion as to the necessity for regulation on the Lake of the Woods in order to produce the best results on the Winnipeg River?

Mr. CHALLIES. I do not think there is any doubt about it. It is absolutely necessary.

Mr. ANDERSON. Have you any range of levels on the lake that you would suggest to the commission that should be established and maintained?

Mr. CHALLIES. Yes, sir; we have thought that there ought to be at least 6 feet of range on the Lake of the Woods.

Mr. ANDERSON. In order to get the best results upon the Winnipeg River?

Mr. CHALLIES. Yes.



MR. ANDERSON. I understand, Mr. Challies, that you have prepared a short report, which is really a brief statement of your position on this matter in connection with the reference and as it affects your department?

MR. CHALLIES. Yes, sir.

MR. ANDERSON. I suppose, Mr. Chairman, it is hardly necessary to read that if the report is submitted and put in. We want to get through as quickly as possible, and I do not suppose it will serve any useful purpose to read it now.

MR. MAGRATH. It may be inserted into the record at this point. (The statement prepared by Mr. Challies is as follows:)

DOMINION WATER POWER BRANCH,  
*Winnipeg, February 1, 1916.*

THE SECRETARIES, INTERNATIONAL JOINT COMMISSION,  
*Winnipeg, Manitoba.*

DEAR SIR: 1. At the public hearing of the International Joint Commission at Kenora, September, 1912, the undersigned submitted a short general statement dated September 17, 1912, setting out the reasons why the department of the interior was interested in the Lake of the Woods reference and pointing out so far as it was possible at that time the necessity for regulation and control of the waters of the Lake of the Woods watershed in the interests of the water powers on the Winnipeg River in the Province of Manitoba.

2. In this statement it was pointed out that the policy of the interior department in administering water power was to insure maximum possible advantageous development and to provide sufficient information to dictate developments consistent with this policy, the department had under way a complete investigation of the water resources of the whole Winnipeg River basin, with special reference to the development of power on that stretch of the Winnipeg River in the Province of Manitoba.

3. These investigations which have been unusually comprehensive, covering all pertinent phases of the power situation, have been recently completed and show conclusively that practically all of the fall of the Winnipeg River within the Province of Manitoba, about 270 feet, can be concentrated and used for power purposes at 9 distinct power sites, two of which are now partially developed and another of which is about to be developed.

4. The two partially developed sites are:

(1) The plant of the Winnipeg Electric Railway Co., located on the Pinawa Channel of the Winnipeg River, 58 miles from the city of Winnipeg, was commenced in 1902 and completed and placed in operation in 1906. There is at present installed a turbine capacity of 34,000 horsepower which supplies power for use in and around greater Winnipeg.

(2) The municipal plant of the city of Winnipeg, located at Point du Bois Falls on the Winnipeg River, 75 miles from Winnipeg, was commenced in 1909 and placed in operation in September, 1911. It was constructed by the citizens of Winnipeg in order to meet the growing demand for power and to introduce competitive conditions in the power market. The plant has at present installed eight turbine units with a capacity of 47,000 horsepower, and an additional provision is made for an equal number of units in the uncompleted portion of the power station. The operation of the present installation to full capacity requires a flow greater than the natural low-water discharge of the river past the plant.

5. The entire output of both the above-mentioned plants is transmitted to the city of Winnipeg for distribution for general industrial, lighting, domestic, power, and traction purposes. That this power demand is increasing is conclusively shown by load-growth curves of the city of Winnipeg since 1906, i. e., since the inauguration of the first hydroelectric station on the Winnipeg River. The increasing power demand is also indicated by the fact that the city of Winnipeg has installed three 7,000-horsepower turbines since the beginning of 1904 and by the fact that the Winnipeg River Power Co., an allied interest of the Winnipeg Electric Railway Co., has recently secured from the department the right to develop what is known as the Du Bonnet power site. While present financial conditions, due to the war, have delayed the commencement of

actual construction work, the engineers of the company have been continuously engaged for the past 18 months on the detail construction plans and have constructed a 13-mile spur railway line connecting the site with Lac du Bonnet Station on the Canadian Pacific Railway.

6. The seven undeveloped power sites of the river offer exceedingly favorable opportunities for power development both from economic and engineering standpoints. The head available at each site and its distance from Winnipeg, also the power available under present low-water flow, is tabulated hereunder:

Site.	Distance from Winnipeg, in miles.	Head, in feet.	Continuous 24-hour power at 75 per cent efficiency under present low flow in Manitoba (12,000 cubic-foot seconds).
Pine Falls.....	64	37	37,900
Du Bonnet Falls.....	64	56	57,300
McArthur Falls.....	62	18	18,400
Lower Seven Sisters.....	52	37	12,600
Upper Seven Sisters.....	55	29	9,900
Upper Pinawa.....	58	29	12,300
Slave Falls.....	74	26	26,600
Total.....			175,000

7. As showing the direct influence of the Lake of the Woods on the power resources of the Winnipeg River in Manitoba, and considering only the run-off originating in the watershed above the lake, the following table is of interest:

Continuous discharge from the Lake of the Woods in second-feet.	Corresponding continuous 24-hour power at 75 per cent efficiency capable of economic development on the Winnipeg River in Manitoba (exclusive of Ontario).
1 5,060	106,000
6,000	125,000
6,770	140,000
7,000	146,000
8,000	167,000
9,000	188,000
10,000	209,000
11,000	230,000
12,000	250,000

1 Actual recorded minimum mean monthly discharge.

2 Computed natural mean monthly discharge.

3 The approximate average flow for period 1907-1914.

The above tabulated powers corresponding to various rates of flow show conclusively the influence which the Lake of the Woods run-off has on the Winnipeg River powers in Manitoba. The rates of flow listed can only be insured by a systematic control of the lake outflow in the interests of power storage. The magnitude of the continuous dependable outflow from the lake is dependent on the storage range permissible.

8. In this connection it is pointed out that the Lake of the Woods has been under regulated conditions since the construction of the Norman Dam. While this regulation has been mainly in the interests of navigation, it has been of benefit to the water powers on the Winnipeg River in Manitoba. Further, the Norman Dam has been operated to furnish additional flow to meet the requirements of the Winnipeg Electric Railway Company's power plant; such operation has been effected at the request of the company by arrangement with the Ontario government and the power interests at the outlets of the lake.



9. The importance of these large amounts of available, economically feasible, and conveniently located power to the industrial and commercial future of the population of Manitoba can not be overestimated.

10. Growth curves both of population and power load for the city of Winnipeg during the past nine years indicate that the entire output of the river in Manitoba will be required by the market of the city of Winnipeg alone within a short period of years, leaving out of consideration all supplementary demands, such as for electrification of railway terminals, for distribution to neighboring municipalities, for pulp and paper, and for electrochemical purposes.

11. There is now a total of approximately \$170,000,000 of capital invested in industries in the Greater Winnipeg districts, directly dependent upon Winnipeg River power, which invested capital represents an annual payroll of about \$24,000,000 a total annual product worth over \$135,000,000, and with about 30,000 persons directly engaged therein.

12. The figures represent only what may be termed industrial and commercial interests, for which definite figures could be obtained. They do not include the large interests represented by institutions nor the domestic use of electric light and heat. Light and heat alone account for over 36 per cent of the total connected load.

13. Winnipeg is peculiarly dependent on hydroelectric power for the following reasons:

(a) On account of the high cost of steam coal (\$6 and \$7) and gas (\$1.50) hydroelectric power has so completely superseded fuel power that the remaining private fuel plants not using hydroelectric power only constitute 3 per cent of the total connected load.

(b) Gas is not used for power and only to a negligible extent for lighting.

(c) Compared with 19 leading cities of similar size in the United States and Canada, Winnipeg has a larger consumption of electricity per capita than any and much larger than most.

14. Unlike most other cities, Winnipeg does not possess alternative sources of light and power and is for all practical purposes entirely dependent upon hydroelectric power for light, power, traction, and water supply.

15. Since cheap hydroelectric power became available in 1907 the use thereof has increased 513 per cent while the population increased 102 per cent.

16. The only source of hydroelectric power in sufficient quantity and within practicable transmission radius is the Winnipeg River.

17. The present rates, compared to the average of rates charged in other cities, meant in 1914 an annual saving to the greater Winnipeg community of over \$3,000,000, and this will of course increase annually with the growth of population.

18. It is therefore submitted:

(a) That the only available source of hydroelectric power for Winnipeg is the Winnipeg River.

(b) That the Winnipeg River offers unusual natural advantages for the development of power.

(c) That these advantages have already been utilized to the extent of 81,000 horsepower actually installed turbine capacity.

(d) That the power available on the Winnipeg River in Manitoba dependent upon the flowage of the Lake of the Woods ranges from 106,000 to 250,000 24-hour continuous horsepower at 75 per cent efficiency, corresponding to various rates of flow ranging from the actual recorded minimum mean monthly flow.

(e) That it is only a matter of a comparatively short space of time before all the available power will be required and developed.

(f) That there is no alternative source of power, and for all practical purposes Winnipeg and district is entirely dependent upon hydroelectric power for light, traction, and water supply.

(g) That there is at the present time directly dependent upon the portion of the total capacity of the river now developed, capital invested in industries to the extent of about \$170,000,000.

(h) That the tremendous present and future potential value of these water powers on the Winnipeg River in Manitoba requires that the flow from the Lake of the Woods be regulated to the greatest possible extent.

(i) That such regulation can only be attained by a satisfactory storage range on the lake.

19. The conclusions which the engineers of the Dominion water power branch respectfully submit as a result of a study of the run-off records of the watershed

and the requirements of the power interests on the Winnipeg River in Manitoba, is that at least a 6-foot storage range on the lake is necessary if its reservoir capacity is to be utilized to the best advantage in the interests of the water powers of the river below.

I have the honor to be, sirs, your obedient servant,

J. B. CHALLIES,  
*Superintendent Dominion Water Power Branch.*

Mr. ANDERSON. Who is your chief engineer, Mr. Challies?

Mr. CHALLIES. Mr. Johnson.

Mr. ANDERSON. He has obtained a lot of information with reference to the situation on the Winnipeg River?

Mr. CHALLIES. Yes, sir.

Mr. ANDERSON. I suppose you will be only too glad to have him give any information which he has to the consulting engineers?

Mr. CHALLIES. Yes, sir.

Mr. ANDERSON. Have you done anything with reference to getting information from a statistical standpoint, with reference to the benefits that might be derived from the use of the waters of the Winnipeg River?

Mr. CHALLIES. Yes; we have had our electromechanical engineer, Mr. Kemsit, make an investigation of the industries in Winnipeg and the surrounding district that are dependent on these developed water powers.

Mr. ANDERSON. He has spent a good deal of time in doing that, I understand?

Mr. CHALLIES. About six or seven months.

Mr. ANDERSON. Where is the source of supply of water power for Winnipeg and the Province of Manitoba?

Mr. CHALLIES. Practically entirely on the Winnipeg River. It is practically the only source of hydroelectric power.

Mr. ANDERSON. And the city of Winnipeg for its hydroelectric power is dependent entirely, in your opinion, upon the Winnipeg River?

Mr. CHALLIES. Yes, sir.

Mr. ANDERSON. That applies, generally, also to the Province of Ontario, does it?

Mr. CHALLIES. It applies to the southern or settled portions of it.

Mr. ANDERSON. Yes; in that territory there is water power, but that would not be available at the city of Winnipeg. It would not be commercially feasible to bring it into the city of Winnipeg.

Mr. CHALLIES. There is no other source of available power within 250 miles of Winnipeg—that is, no other important source. There are small water-power sites.

Mr. ANDERSON. I understand, Mr. Challies, that it is the policy of your department not to part with the title in these water powers. You only grant certain limited concessions for a number of years?

Mr. CHALLIES. Yes; our regulations provide that we grant the concession for a limited term of years, the Government always retaining the proprietary interest in the power site. We simply grant a right to use it.

Mr. ANDERSON. And you retain more or less control?

Mr. CHALLIES. Absolutely; the control of rates, etc.

Mr. ANDERSON. I think that your conclusions in connection with that matter are stated in paragraph 18 of your report, are they not?



Mr. CHALLIES. In paragraphs 18 and 19.

Mr. MAGRATH. That is the report that you have just submitted to be incorporated into the record?

Mr. ANDERSON. Yes, Mr. Chairman. Now, Mr. Challies, is there anything else that you wish to add to the statement that you have filed and to the oral statements that you have made, with reference to water powers, I mean?

Mr. CHALLIES. Simply this, sir; that after the consulting engineers' report is finally in I might like to have the privilege of submitting a supplementary statement.

Mr. ANDERSON. Have you formed any opinion as to whether or not in the comparatively near future all the power that can be developed upon the Winnipeg River will be required or utilized?

Mr. CHALLIES. We think it is only a matter of a comparatively short time until all the power sites on the river are developed.

Mr. ANDERSON. And the possibilities for the city of Winnipeg as a manufacturing center are limited to the power they can get from the Winnipeg River?

Mr. CHALLIES. Absolutely. It is the only source of hydroelectric power, and on account of the high price of coal practically the only economical source of power of any kind.

Mr. ANDERSON. Now, leaving the water-power branch, is there any other branch of the interior department that is interested in this reference at all?

Mr. CHALLIES. Yes, sir; the land branch of the interior department is more or less interested in the land that may be flooded around the shore of the Lake of the Woods in the Province of Manitoba.

Mr. ANDERSON. That is, the Dominion Government owns certain lands in the Province of Manitoba adjacent to the shores of the Lake of the Woods?

Mr. CHALLIES. Yes, sir.

Mr. ANDERSON. Is there any other respect in which your department is interested? Are you interested in Indian lands?

Mr. CHALLIES. The department of Indian affairs, which is a separate department from the interior department, is also interested in the question of the effect that the range of levels in the Lake of the Woods may have on the Indian lands around the shore of the Lake of the Woods.

Mr. ANDERSON. Can you tell me whether or not there are any Indian lands which have not been covered by the reconnaissance made by the engineers to the commission?

Mr. CHALLIES. I can not say that definitely, sir. I can state this: That the topographic sheets of the consulting engineers include a great many Indian reserves. There are other Indian reserves around the shores of the Lake of the Woods that are not on these topographic sheets, and which may be more or less affected by range of levels in the lake.

Mr. ANDERSON. Mr. Chairman, with reference to the Indian lands and the lands belonging to the Dominion Government which may be affected, all we wish to do at present is to state that there are such lands, and ask that they be given the same consideration as the other lands affected when you come to deal with that aspect of the situation.

Mr. TAWNEY. How are those lands disposed of by the Dominion Government?

Mr. ANDERSON. They may be sold or homesteaded. I think the lands that they have on the shore of the Lake of the Woods in Manitoba are open for sale or homestead, are they, Mr. Challies?

Mr. CHALLIES. The Government has reserved all the lands around the shore of the Lake of the Woods until the commission has made its findings as to the proper range.

Mr. TAWNEY. Before that reservation was made what did the Government obtain per acre when it sold the lands?

Mr. CHALLIES. They were subject to homestead entry.

Mr. TAWNEY. \$3 an acre?

Mr. CHALLIES. \$10 was the only fee that they required from a homesteader.

Mr. CAMPBELL. That would be even-numbered sections; the odd-numbered sections were subject to railway land grant, and then a large section of the others were ceded to the Province as swamp lands.

Mr. POWELL. \$10 simply covered the patent.

Mr. TAWNEY. \$10 simply covered the patent?

Mr. CAMPBELL. Not \$10 an acre?

Mr. ANDERSON. No; \$10 fee for entry.

Mr. CHALLIES. Of 160 acres.

Mr. ANDERSON. Do you know anything about any sales of those lands? Those lands originally were turned over to the Province of Manitoba, were they not, and then ceded back again by the Province to the Dominion?

Mr. CHALLIES. There were no swamp lands down in that district.

Mr. ANDERSON. Those lands that you speak of were reserved exclusively for homestead purposes?

Mr. CHALLIES. Yes.

Mr. ANDERSON. They were not offered for sale?

Mr. CHALLIES. They were subject to purchase.

Mr. ANDERSON. Do you know at what price or prices?

Mr. CHALLIES. I think the usual price is \$3 an acre. I have a list of the Indian reserves that are affected outside of the sheets of the consulting engineers.

Mr. ANDERSON. That is, you have a list of the lands in the Indian reserves. What do you mean by "Indian reserves"; the lands in the Indian reserves or just the name of the Indian reserves?

Mr. CHALLIES. These Indian reserves are not named; they are numbered.

Mr. ANDERSON. Then, you have the numbers?

Mr. CHALLIES. Yes.

Mr. ANDERSON. Do those numbers not indicate the areas of the land included?

Mr. CHALLIES. No; what I have before me is information which sets out the number of the Indian reserves and the acreage affected in each reserve.

Mr. MAGRATH. Affected by what?

Mr. CHALLIES. That may be affected by a range of levels of the lake.

Mr. POWELL. Does it also give information as to the extent to which they may be affected?

Mr. CHALLIES. That, sir, depends entirely on the range of levels.

Mr. ANDERSON. I think the best thing to do with reference to this is to simply file a statement with the commission giving particulars as to those lands.



Mr. TAWNEY. Are these lands exclusive of the lands that are included in the surveys of the consulting engineers?

Mr. CHALLIES. Yes, sir.

Mr. TAWNEY. They are outside of the engineers' reports.

Mr. CHALLIES. They are exclusive of the topographic sheets. They may have made other surveys in addition.

Mr. TAWNEY. Mr. Anderson, if this statement shows the acreage that would be affected at certain levels, there is no need of any further information.

Mr. ANDERSON. I will put this in then.

Mr. CHALLIES. I want to be understood, sir, as to these Indian lands. The deputy superintendent general of Indian lands simply asked me to state to the commission that some of their lands were affected, and they merely wanted a chance to be heard, if necessary.

(The statement submitted by Mr. Challies is as follows:<sup>1</sup>)

DOMINION WATER POWER BRANCH,  
Ottawa, January 20, 1916.

THOS. H. DUNN, Esq.,  
Chief Engineer of Reclamation,  
Dominion Water Power Branch,  
Ottawa, Ontario.

SIR: Following receipt of your instructions of October 29, 1915, I went to Kenora and made an examination of the following Indian reserves:

Indian reserves Nos. 38B, 38A, 32B, 32A, 33A, 34A, 34, 31A, 35A, 35J, 35B, 35H, 32C, 35C, 35F, 35D.

As Mr. McKenzie was unable to accompany me on the inspection trip, he kindly sent with me Mr. Hansom, his constable. Having hired a launch and man from Mr. J. W. Stone, we left Kenora Saturday morning, October 30, and inspected Indian reserve No. 38A, returning to Kenora in the evening. On October 31 and November 1 we inspected Indian reserves Nos. 32A, 33A, 34A, and 32B. On November 2 we inspected Indian reserves Nos. 34, 31A, and 35A; on November 3, Nos. 35J, 35B, 35H, and 32C, and on November 4, 38B.

These reserves are generally high and rocky, being totally unfit for agricultural purposes. By raising the elevation of the Lake of the Woods from 1,060.5 to 1,062.5, very little land will be flooded or damaged in each case. I have made an estimate of the number of acres flooded on each reserve by raising the elevation of the lake from 1,060.5 to 1,062.5. It is understood that this is a very rough estimate, as no instrumental examination was made.

The number of acres damaged on each reserve by raising the elevation of the Lake of the Woods from 1,060.5 to 1,062.5 is as follows:

Indian reserve:	Acres.
No. 38B	5
No. 38A	9
No. 32B	4
No. 32A	7
No. 33A	2
No. 34A	1
No. 34	8
No. 31A	3
No. 35A	1
No. 35J	4
No. 35B	--
No. 35H	--
No. 32C	2
No. 35C	--
No. 35F	3
No. 35D	--
Total	49

<sup>1</sup> This memorandum considers certain areas with respect only to certain contours, and Mr. Dunn states that any areas subject to possible flooding would have to be determined from the data of the consulting engineers.

The most extensive damage, resulting from raising the elevation of the Lake of the Woods, in connection with the Indian reserves is the destruction of the wild rice beds. At the time of my visit these beds for the most part had already been destroyed by the high waters of the Lake of the Woods. In the past these beds furnished the Indians with large quantities of wild rice besides furnishing feeding grounds for wild ducks. I have made a rough estimate of the area of the rice beds destroyed by the high waters of the Lake of the Woods.

The area on each Indian reserve is as follows:

Indian reserve:	Acres.
No. 38B-----	23
No. 38A-----	15
No. 32B-----	40
No. 32A-----	5
No. 33A-----	5
No. 34A-----	2
No. 34-----	30
No. 31A-----	---
No. 35A-----	---
No. 35J-----	15
No. 35B-----	10
No. 35H-----	---
No. 32C-----	15
No. 35C-----	---
No. 35F-----	3
No. 35D-----	---
Total-----	163

All of which is respectively submitted.

I have the honor to be, sir,

Your obedient servant,

G. G. McEwen.

### TESTIMONY OF MR. H. E. N. KENSIT.

H. E. N. KENSIT, having been duly sworn, testified as follows:

Mr. ANDERSON. What is your occupation?

Mr. KENSIT. Electric engineer.

Mr. ANDERSON. Engaged in what department of the Government?

Mr. KENSIT. Dominion water power branch.

Mr. ANDERSON. I understand you were engaged to prepare some statistical information for the water power branch, in connection with the situation in Winnipeg, as to how that was affected by the supply of water from the Winnipeg River?

Mr. KENSIT. I supplied a report on the Winnipeg power, with special reference to capital invested and labor employed.

Mr. ANDERSON. Over what length of time did your investigation extend?

Mr. KENSIT. I was six months in Winnipeg exclusively engaged on that study.

Mr. ANDERSON. And I understand that you obtained a very considerable amount of information?

Mr. KENSIT. Yes.

Mr. ANDERSON. You made a report upon the subject to the department?

Mr. KENSIT. Yes.

Mr. ANDERSON. And have handed a copy of the report to the consulting engineers?

Mr. KENSIT. Yes.



Mr. ANDERSON. There are one or two outstanding features in that report that I want to have you speak about. What have you to say with reference to the position of Winnipeg as a manufacturing center?

Mr. KENSIT. In 1910 Winnipeg then stood, according to the Dominion census, as the fourth manufacturing city in Canada; that is, basing their position on the value of products as given in the census, and since that time it has made such rapid progress, both in the manufacturing line and the value of products and the use of hydraulic power that the probability is that at least its position is as good or better. It can not be compared with the date of the inquiry or reports with the other cities, because there has been no census since 1910, but it stood high at that time and has made rapid progress since.

Mr. ANDERSON. Due principally to what, in your opinion?

Mr. KENSIT. Partly to the growth of population in the west, but owing mainly to the fact that the hydroelectric power became available at a low price in 1907.

Mr. ANDERSON. What have you to say as to the position of Winnipeg as a distributing and railroad center?

Mr. KENSIT. Well, it is the main distributing center for an enormous area in the west. It is difficult to estimate how much, but the volume of business that passes through Winnipeg, and the saving in cost of manufacture and freight, for everything that can be manufactured here, is undoubtedly very great.

Mr. ANDERSON. Give us a short statement as to the growth in the use of power in the city of Winnipeg?

Mr. KENSIT. Since 1907, when the hydroelectric power first became available at low rates on account of two sources of supply being available, the city and the Electric Railway Co., the population has increased from that time, 1907, about 102 per cent, and the increase in electric output generated in the city has been 513 per cent. In giving those figures, I speak of the entire output, the municipal plant and the Street Railway Co.'s plant together.

Mr. ANDERSON. So that the demand for power has very far exceeded the growth of the population?

Mr. KENSIT. Practically five to one.

Mr. ANDERSON. You speak of the cheap rate of power in the city of Winnipeg. How do the rates in Winnipeg compare with other cities on the American continent?

Mr. KENSIT. Perhaps I had better refer to the report, to quote it more closely.

Mr. POWELL. You are going to put the report in?

Mr. ANDERSON. No; the engineers have the report, and I do not propose to put it in, but merely to draw attention to one or two of the outstanding features in it.

Mr. KENSIT. On page 58, taking the cases of about a dozen cities in the United States—

Mr. ANDERSON. What cities? Name them?

Mr. KENSIT. Boston, Chicago, Detroit, Duluth, Jersey City, Minneapolis, New York, Portland, Oreg., St. Louis, Salt Lake City, and Worcester; the initial or base rates range from 6 to 14 cents in Detroit for residence lighting.

Mr. ANDERSON. Per kilowatt hour?

Mr. KENSIT. Yes; and for power from 4.5 to 11 in Chicago. The average of all those cities is 9.54 for lighting and 7.65 for power. Those are base rates; whereas in Winnipeg the base rates are 3½ cents in both cases, and that is subject to substantial discount in both cases.

Mr. ANDERSON. Winnipeg stands preeminent in the matter?

Mr. KENSIT. Preeminently cheaper.

Mr. ANDERSON. And you consider that has a close relationship to the possible growth of the city?

Mr. KENSIT. It undoubtedly has. The growth of population and manufacture platted out in the diagram show a rapid growth in both, since the price of power was reduced, very distinctly.

Mr. ANDERSON. Have you any estimate as to within what period all the available power on the Winnipeg River will probably be required, say in the Province of Manitoba?

Mr. KENSIT. Yes. I have estimated on that.

Mr. ANDERSON. What is your conclusion?

Mr. KENSIT. On the basis of past growth of demand for power in the city, taking that for a number of years past, the average increase in the peak load or maximum demand was about 20 or 21 per cent. Taking it at only at 8 per cent, the total power available on the Winnipeg River under present conditions would be utilized in 26 years; that is from 1914, the date of the information.

Mr. ANDERSON. When you speak of total available power, you mean developed and undeveloped?

Mr. KENSIT. The total available on the Winnipeg River.

Mr. ANDERSON. And you estimate that would be required in 26 years?

Mr. KENSIT. At 8 per cent increase in the demand per annum, which is a very reasonable assumption.

Mr. ANDERSON. That is in view of the percentage of increase that has taken place in the last few years.

Mr. KENSIT. Yes. I took the rate at 8 per cent, and I should like to add, according to the most recent figures I have seen, the rate of increase for peak loads in the last year, when conditions were unfavorable, was over 13 per cent.

Mr. ANDERSON. What about the relative cost of production of power from the Winnipeg River, and the cost from plants that would have to be run by coal?

Mr. KENSIT. Well, the Winnipeg powers are comparatively easy of development; the price of hydro-electric power from that source is low, and, on the other hand, the price of fuel power is exceptionally high.

Mr. ANDERSON. Have you made any calculation as to about the difference in ratio of cost?

Mr. KENSIT. The Winnipeg River power can be delivered in Winnipeg from about \$11 to \$20 in some cases; the steam power would cost, even in comparatively large plants, from \$70 to \$150 per horsepower per year. Those values are based on actual plant invested, some of the largest and best laid plants in the city.

Mr. ANDERSON. Before the introduction of the cheap power from Winnipeg River, how were a number of private plants operated in the city of Winnipeg?



Mr. KENSIT. At the present time, or up to about the middle of 1915, they were almost exclusively operated by electric power, hydroelectric power. Of course there have in the past been a large number of private steam plants, almost exclusively steam, in this city, but since hydroelectric power was available at about  $3\frac{1}{3}$  cents, subject to discounts, in 1907, it has almost entirely superseded private fuel plants. There is a certain number of cases where steam is required in the process of manufacture, in breweries and laundries, and there is a certain number of plants where they need a large amount of steam for heating in the winter, and those plants maintain their steam plants as auxiliaries and for use in winter, and take the hydroelectric power as long as possible during the year from the other sources. Outside of those few special cases, the fuel plants left in the city do not amount to more than about 3 per cent of the hydroelectric power that is being supplied.

Mr. ANDERSON. You say fuel is very expensive in Winnipeg?

Mr. KENSIT. Yes.

Mr. ANDERSON. How does it compare—I do not mean specifically, but generally—with the cost of fuel in other cities on the American continent?

Mr. KENSIT. It is about double the average price in United States manufacturing cities in the East. I have a list of the actual prices charged for steam consumption to the power stations in the eastern cities, which I have added up and averaged, and it is just about half the cost in Winnipeg.

Mr. ANDERSON. I suppose it is really more expensive here than in any other city of any size?

Mr. KENSIT. It is the most expensive of any city that I know of, not only in the United States but in Canada.

Mr. ANDERSON. Have you made any calculation as to how much per annum the people of Winnipeg are saving by reason of the introduction of hydroelectric power?

Mr. KENSIT. I went into that very carefully, and obtained the rates from a number of Canadian and American cities, and considered what would be the average rate in Winnipeg if this cheap hydroelectric power was not available. I put that at a very low figure, based on what it is being made at in other cities under better conditions. Assuming that in Winnipeg the community at large had to pay at the average initial rate in other cities, instead of the price in Winnipeg of  $3\frac{1}{3}$ , the difference in cost on the output in 1914 would be about three million dollars, and that difference of cost would increase annually with the growth of the population.

Mr. ANDERSON. Have you anything to say as to the per capita consumption of power in Winnipeg as compared with other cities?

Mr. KENSIT. The output in kilowatt hours is larger in Winnipeg than in any of the list of 19 similar cities in the United States, manufacturing cities.

Mr. ANDERSON. Per capita?

Mr. KENSIT. Yes, it is larger; I can give you the list in detail.

Mr. ANDERSON. It is all in the engineers' copy?

Mr. KENSIT. Yes.

Mr. MAGRATH. I understand you have a couple of affidavits you wish to file.

Have you further witnesses, Mr. Keefer?

Mr. KEEFER. Probably two more; this is probably the last hearing for evidence, and we would like to put our evidence in to-morrow.

Mr. BERKMAN. It would give more time if we could take it up in the morning.

Mr. MAGRATH. How much more evidence will there be?

Mr. KEEFER. I have Mr. Stewart. He will take half an hour or more. He is in the same position as Col. Patrick. You have heard the power phase and we want to give the Government navigation phase.

(Adjourned till 9.30 to-morrow.)

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WINNIPEG, FEBRUARY 4, 1916.

Pursuant to adjournment the commission met at 9.30 a. m.

#### STATEMENT OF MR. R. S. LEA.

Mr. R. S. LEA. I wish to refer to a point which I think should be emphasized, and that is the fact that, as the dependable flow is increased by more and more storage, each additional cubic foot per second of flow thus assured becomes more valuable relatively to the power interests. This will be obvious when we remember that there is a certain expenditure, such as that for dams, embankments, which is largely independent of the capacity of the plant installed; consequently as the flow is increased, additional generating capacity can be secured at a greatly reduced cost.

For instance, considering the Grand du Bonnet installation with dependable flows of 18,000 second-feet and 22,000 second-feet respectively; the capital cost per horsepower installed to utilize the additional 4,000 second-feet flow would be less than one-half the capital cost per flow.

It will thus be apparent how a restriction of effective storage capacity on the Lake of the Woods watershed may so affect the net returns from a power plant on the Winnipeg River as to make all the difference between a proposition which would be attractive to investors and one which would not be.

This point is of even greater importance to the undeveloped power sites since Grand du Bonnet and Point du Bois are the most economical hydroelectric propositions on the Winnipeg River.

#### TESTIMONY OF MR. W. J. STEWART.

W. J. STEWART, chief hydrographer of Canada, having been duly sworn, testified as follows:

Mr. KEEFER. You are in the Government service of Canada?

Mr. STEWART. Yes.

Mr. KEEFER. Your official position is what?

Mr. STEWART. Chief hydrographer of Canada.

Mr. KEEFER. Where did you receive your technical training?

Mr. STEWART. At the Royal Military College, Kingston; that is a Government institution.

Mr. KEEFER. And then you entered the service?



Mr. STEWART. Yes.

Mr. KEEFER. With regard to all the surveys of the lake and hydrographic work of the Dominion of Canada, what have you had to do with that?

Mr. STEWART. I started surveying on the Great Lakes on the hydrographic survey in 1884, when the survey was first started, and I succeeded to the position of officer in charge in 1893, and I have been in that capacity ever since. Our survey work extends all over the Great Lakes and on the Atlantic coast and Pacific coast and Hudson Bay.

Mr. KEEFER. I believe that upon the International Waterways Commission, that preceded this commission, you had an official position of some nature?

Mr. STEWART. I was one of the commissioners on that.

Mr. KEEFER. One of the three Canadian commissioners?

Mr. STEWART. Yes.

Mr. KEEFER. And that commission had to deal with what important questions?

Mr. STEWART. Questions concerning the use of the waters of the Great Lakes, and we made a report on the question of the regulation of the level of Lake Erie.

Mr. KEEFER. You were dealing with the regulation of the level of Lake Erie?

Mr. STEWART. Yes.

Mr. KEEFER. That would involve, I should think, some points about the level of Lake Ontario, also being somewhat similar?

Mr. STEWART. Incidentally all the lakes came into that.

Mr. KEEFER. By the way, just in passing, can you state to the commission, just as information, what was the ascertained range of the variation of the levels, say of Lake Erie and Lake Ontario?

Mr. STEWART. I can not, offhand, give you the exact figure, but I think it was 5 or 6 feet on Lake Erie and a little more on Ontario, and the proposition was to build a dam across the outlet of Lake Erie, to hold the range within a foot and a half or 2 feet.

Mr. KEEFER. I would consider one of the difficulties you would be up against would be the very valuable properties, cities and towns fronting the lakes?

Mr. STEWART. The proposition was to hold the water a little below high water.

Mr. KEEFER. Passing from your previous experience in these problems, you have had, as the senior officer of the Government, practically, through your staff and the different assistants in the large department, the chief charge of this problem to report to this commission?

Mr. STEWART. As far as investigation amongst the Government officials is concerned, yes.

Mr. TAWNEY. Mr. Stewart's qualifications have been so frequently stated before this commission that they are now on record.

Mr. KEEFER. I thought it was before the former members.

Mr. TAWNEY. No; before this commission.

Mr. POWELL. There are two or three gentlemen, Col. Patrick and Mr. Stewart, of whose capacity we will take judicial notice.

Mr. MIGNAULT. It is not necessary to convince the commission which is already convinced.

Mr. KEEFER. I look upon Col. Patrick and Mr. Stewart as men whose statements I consider very valuable.

Mr. POWELL. The only thing we have to guard against is the splendid lucidity of both.

Mr. KEEFER. Your assistants for gathering data chiefly in this matter, irrespective of different departmental officers like Mr. Challies, and so forth, has been whom?

Mr. STEWART. Mr. Scovil.

Mr. KEEFER. Just before passing that, you have, I suppose, given very careful consideration to all the physical data and other material that has been compiled by the consulting engineers of the commission?

Mr. STEWART. Yes; with Mr. Scovil's assistance, we have gone through all the data. We had most of it before the report was published, and we have checked it all over—the additional data they had.

Mr. KEEFER. You might state, as the technical man, what is the result of that?

Mr. STEWART. We had very, very slight disagreements on any point in connection with the two investigations which were carried on quite independently; there was no communication between one department and the other, so that I think it is a great satisfaction to both branches that the results tallied so well.

Mr. KEEFER. Therefore, you are prepared to say that you accept completely the data that has been furnished by the consulting engineers?

Mr. STEWART. We accept that as the very best that can be obtained, the best deduction that can be made from the records which existed then.

Mr. KEEFER. Therefore, deductions from that ought to be properly drawn and well based?

Mr. STEWART. I think so, yes.

Mr. KEEFER. Speaking of the navigation phase of this problem, have you charge of that in particular?

Mr. STEWART. I have been asked to represent the department of public works, which is charged with all improvements in connection with navigation, in addition to my other position.

Mr. KEEFER. You have been in attendance at the sessions at Kenora, Warroad, and different points practically since it started?

Mr. STEWART. Yes.

Mr. KEEFER. And have practically heard all the testimony?

Mr. STEWART. Yes.

Mr. KEEFER. With that testimony, and with your own knowledge departmentally, what do you fix, speaking only from the point of navigation, as an advisable minimum, that this lake should be, if possible? It may be overridden by other interests, but from the point of view of navigation, what would you like to see the water?

Mr. STEWART. Of course, during the navigation season, the level of the lake should be held as nearly constant as possible.

Mr. KEEFER. And that season is from when to when?

Mr. STEWART. From about the middle of May to about the middle of October.

Mr. KEEFER. And what level would you like that to be, if it were possible?



Mr. STEWART. Well, from the evidence that was presented at Kenora, and what I know of navigation requirements, I should think it should be somewhere between 1,059 and 1,061, keeping as close to 1,060 and 1,060.5 as possible, but you can not make sure you are going to hold it in such a small range.

Mr. KEEFER. Upon that point, the text of the consulting engineers sets forth the request of the officials of the United States War Office as to the level which I think they then desired to be 1,062.8 as a minimum?

Mr. STEWART. 1,060.8.

Mr. KEEFER. That is referred to in the text at page 11, and reference is made to the communications between the United States Government and the Canadian Government, which resulted in the matter coming up with the Ontario Government. Have you a copy of Mr. Fairbairn's letter on that subject to his minister?

Mr. POWELL. That is in evidence.

Mr. KEEFER. Is this letter in evidence?

Mr. STEWART. There is only a statement of the letter. The letter is not.

Mr. KEEFER. I do not think this is in. This is the letter in full: "Mr. Fairbairn there reported practically that it was impossible or inadvisable to attempt to hold the water at a minimum of 7.2 on the Warroad gauge, as was then desired." That is practically the effect of it, is it not, Mr. Stewart?

Mr. STEWART. That is the effect of it, yes; but the arrangement, I think, or understanding was that we were to try to hold it as nearly at that level as possible, but not as a minimum.

Mr. KEEFER. Was that in point of time prior to the building of these dams, or was it after the dam had been built?

Mr. STEWART. Oh, that was after the building of the Norman Dam.

Mr. KEEFER. And the question, then, was how to regulate that dam and what level?

Mr. STEWART. That was the proposition.

Mr. KEEFER. The letter, Exhibit P, reads as follows:

DEPARTMENT OF PUBLIC WORKS, ONTARIO,  
Toronto, June 20, 1916.

Hon. J. O. REAUME,  
*Minister of Public Works, Ontario.*

SIR: Regarding the subject of the level of the Lake of the Woods, with reference to proposed improvements of Warroad Harbor and Warroad River, in the State of Minnesota, by the United States Government, I beg to report as follows:

A suggestion has been made by the United States authorities, that an agreement might be reached with the Canadian authorities by which the dam at Keewatin could be so operated as to prevent the level of the Lake of the Woods from falling below a minimum of 7.2 on the gage at Warroad Harbor.

It is stated that during the year 1904 the gage at Warroad reached 7.2 for the half of one day only, and that it fell as low as 6'' 0'' for several days during the seasons of navigation. I find on consulting the records for the year 1904 that the highest reading recorded on the gage at Rat Portage was 100.90, which occurred on August the 16th. On August the 30th, it had fallen to 100.70; on September the 30th to 100.60; on October the 30th, to 99.90; on November the 30th, to 99.70. The lowest reading for the year was in April, 99.50. It will appear from these readings that the level at Rat Portage would require to be held at 100.90 to maintain the elevation of the water at 7.2 on the gage at Warroad Harbor, the minimum height requested by the United States authorities.

Several large industries would be seriously affected if it were attempted to hold the water of the Lake of the Woods to this elevation throughout the season of navigation.

The sawmill of the Rat Portage Co. in the town of Kenora would be in constant danger of flooding, as I find in a report of Mr. Robert McCallum, dated June 15, 1903, that with an elevation of 101.05 on the Rat Portage gage, false floors were laid in the Rat Portage Mills to keep the men and materials out of the water, and that considerable inconvenience and annoyance was being experienced owing to the sawdust and refuse getting wet while being carried to the burner. It is quite evident, therefore, that to maintain a minimum elevation of 100.90 it will be necessary to raise the machinery and lands of the Rat Portage Lumber Co. at a cost of many thousand dollars.

The industries using the water powers at the outlet of the Lake of the Woods would also be seriously injured by maintaining the elevation of the Lake of the Woods at 100.90 during the early period of navigation each year or until the flood waters have passed. The injury sustained by the power users is caused by back water in the Winnipeg River reducing the head on their water wheels. There are obstructions to the flow of the water in the river, the principal one being at "Throat Rapids," about 14 miles below Rat Portage. Those obstructions cause the water to be held up in the river to such an extent as to reduce the head available from a normal 21 feet to 16 feet, and sometimes even to 15 feet. This loss of head is greatly lessened by allowing the water in the Lake of the Woods to discharge gradually during the early part of the season.

The flood water can be better regulated and the loss of power minimized by having the water at a low stage when the flood water comes down from the tributary streams in Canada and Minnesota, which occurs generally in the month of June. The difficulty of regulating the levels of the Lake of the Woods in the interests of all parties concerned, and especially in the interests of navigation both in Canada and the United States, would be greatly relieved if the machinery and lands of the Rat Portage Lumber Co. were raised and improvements made in the Winnipeg River below Rat Portage. It is very desirable that these should be carried out, as it is impossible to operate the dam so as to maintain a sufficient elevation for navigation without seriously injuring the industries at Kenora and Keewatin.

While the present conditions exist, the loss to the industries at Kenora and Keewatin by maintaining a minimum elevation of 7.2 at Warroad Harbor, would be so great that the request of the United States authorities could not be recommended. If, however, the improvements mentioned above were carried out, there would be no difficulty in the way of making an agreement by which the dam at Keewatin could be so operated as to prevent the level of the Lake of the Woods from falling below 7.2 at the gage at Warroad Harbor.

I have the honor to be, sir,

Your obedient servant,

R. P. FAIRBAIRN,  
*Engineer Public Works.*

I hereby certify that I am satisfied that the above is a true copy of the original report.

R. P. FAIRBAIRN,  
*Deputy Minister of Public Works.*

TORONTO, *January 18, 1916.*

Mr. TAWNEY. You might state the relation between the Warroad gauge and the gauge at Kenora.

Mr. KEEFER. The data that is in that letter was on the Warroad gauge. The request was made for not less than 7.2. The sea level datum would relate to what figure?

Mr. STEWART. 1,060.8.

Mr. KEEFER. And as a uniform level, or average, if possible, how would 1,060.8 suit you, for navigation purposes only, I am speaking of?

Mr. STEWART. It would be very suitable as an average; in fact, that would make it a very high level. If you kept it at that average you would have to be above that pretty often, unless you had pretty close control.



Mr. KEEFER. For the purposes of navigation, and looking at it not as a power problem at all, you would coincide with the desire of the War Office?

Mr. STEWART. Yes.

Mr. MIGNAULT. Are you putting in the whole correspondence?

Mr. KEEFER. I would only be too glad to do so, if it is not in. We do not want to encumber the notes. Just upon that point, Mr. Wyvell has kindly furnished me with the extracts from some reports that were asked for at our last session at Warroad, and they relate to a memorandum to the War Office prepared by a Mr. Gould. I will put this in. It is referred to in the previous evidence. (Document filed and marked Exhibit 18.) You requested, I think it was Judge Koonce, to supply you with the data from which that memorandum is roughly prepared?

Mr. STEWART. Yes.

Mr. KEEFER. And you obtained a certified copy, certified in a similar manner to that, from him?

Mr. STEWART. Yes.

Mr. KEEFER. I think that Mr. Magrath has that—the certified copy Judge Koonce furnished Mr. Stewart.

Mr. MAGRATH. Yes.

Mr. KEEFER. Then I will treat it as going in here. It appears to be a brief and record of the proceedings, and the reports of the Army engineers were referred to and copied in full. [Report Exhibit 19.]

Mr. MIGNAULT. These documents should be printed in the record.

Mr. KEEFER. The reports of the Army engineers should be printed, but the brief of the lawyers need not be printed. The official documents might well be printed.

Mr. GLENN. Is navigation increasing or diminishing on the lake?

Mr. STEWART. I think it is rather decreasing. The principal business now, as shown by the evidence, on the Lake of the Woods is the lumbering business, towing logs.

Mr. GLENN. And that is getting less every year?

Mr. STEWART. I do not think that is getting very much less, but the passenger business has decreased greatly since the building of the railway.

Mr. GLENN. Are they cutting all the timber there pretty fast?

Mr. STEWART. They are getting out pulpwood and timber all the time.

Mr. KEEFER. On the Lake of the Woods, the lumbering heretofore has been chiefly confined to manufacture of lumber, is it not?

Mr. STEWART. Yes.

Mr. KEEFER. Do you know of any pulp mills on the Lake of the Woods?

Mr. STEWART. There are no pulpwood mills on the Lake of the Woods.

Mr. KEEFER. So that the pulpwood timber, whatever it is, of that large area, is still intact?

Mr. STEWART. I think a good deal of it goes to International Falls; I am not very sure about that. I am told it is still intact.

Mr. KEEFER. To take it to International Falls, you would have to take it up stream.

Mr. STEWART. You have heard of the Watrous Island boom; there is considerable timber there.

Mr. KEEFER. Mr. Rockwood tells me the supply of his clients would come almost entirely from the Lake of the Woods; practically it is virgin yet?

Mr. STEWART. Yes.

Mr. KEEFER. You have told me, as far as your judgment goes of the river bed, about 1,061 would be feasible for navigation purposes, if you could maintain it?

Mr. STEWART. Yes.

Mr. KEEFER. But you pointed out that that would bring your excess storage or surplus, whatever you call it, for flood purposes up pretty high?

Mr. STEWART. I am told it would.

Mr. KEEFER. Where would they take it to, roughly speaking?

Mr. STEWART. For extreme cases 2 feet would be the allowance for excess storage; that would be 1,063.

Mr. KEEFER. Taking your minimum for navigation, how low would you advise against taking down water for navigation?

Mr. STEWART. I think under very exceptional circumstances the water could be held, during the navigation season, not much below 1,060, if at all; that is during the navigation season.

Mr. KEEFER. But in extreme cases, what would be the minimum you would not like to see it go below in the summer season?

Mr. STEWART. In extreme cases?

Mr. KEEFER. In case the commission deem it advisable to get a minimum as well as a maximum?

Mr. STEWART. I do not exactly understand the question.

Mr. KEEFER. How low would you, representing navigation, be willing to concede the water going, in order to meet reasonable conditions; that is, only speaking of navigation? It might have to be overridden for power?

Mr. STEWART. It might be possible it would have to go below 1,060, but I would not like to see it go below 1,060.

Mr. KEEFER. Speaking of the point of view of the fisheries, of which we have had some evidence, how would the level of 1,060 or 1,061 suit the fisheries?

Mr. STEWART. Those conditions should suit the fishing very well; they do not want a very great change of level; they want the level held as nearly constant as possible; small variations.

Mr. KEEFER. Taking all these things into consideration, what would you suggest as the level for what we might call the ordinary maximum level? What would be the height at sea level figures?

Mr. STEWART. I would suggest 1,060.5.

Mr. KEEFER. In other words, that would be the point at which you would begin to waste water?

Mr. STEWART. Yes. As soon as the water reached that on the upward move, I would suggest that the sluices be opened and let the water go.

Mr. KEEFER. Have you considered how much of an opening capacity you would suggest, how much water to spill in extreme cases at that point?

Mr. STEWART. If you attempt to spill a large quantity of water at the outlet, you are going to create trouble down below with your campers. As was shown yesterday, they are not affected by the high water of the Lake of the Woods directly; they are only affected by



the high discharge, and for that reason I think the outlet should usually have a discharge capacity of about 40,000 at 1,060.5.

Mr. KEEFER. So that you would take your first data 40,000 as a flow and ordinary maximum 1,060.5?

Mr. STEWART. Yes; it might be advisable to have the outlet in such a condition that you could discharge more than that under exceptional circumstances.

Mr. KEEFER. Taking those two suggested data, where would you then reasonably estimate, as an engineer, your extraordinary maximum would go to, or how much excess storage would you have to provide for above that figure of 1,060.5, with the data that has been gathered by the consulting engineer?

Mr. STEWART. Computations show that, with a discharge of about 40,000, that the excess storage might amount occasionally to 2 feet, and the extreme upward limit might be fixed at 62.5, a limit that would not be reached once in 20 or 25 years.

Mr. KEEFER. And for how long then?

Mr. STEWART. It would be a short period, only a few months; that is as far as the records show. In the future it might be different from what we have had. I can only speak from what we have had.

Mr. KEEFER. When we have been talking in the evidence of 1,062.5, the campers and others who have given testimony seem to have taken great alarm on that point. As I understand, that would give the average normal level pretty much beyond what they have been asking for—1,060.5—what Mr. Deacon and those have been talking about.

Mr. STEWART. Looking over the records since 1898—since the Norman Dam has been put in—the mean summer level has been 60.2 and the highest monthly mean was in 1891, when it reached 61.3. The mean for the summer was 61.04, so that in fixing the spilling point at 1,060.5 would be about the same condition that the campers have had, perhaps a little better for them.

Mr. KEEFER. Taking 1,060.5 as the ordinary average or ordinary maximum, what would you say would be the percentage of time at which the water would stand thereabouts, over the period, say, of 21 years? How much of the time would it be, especially in the summer months, when the high season is?

Mr. STEWART. It would stay within 5 or 6 inches of that point nearly 90 per cent of the time.

Mr. WYVELL. Do you mean with perfect control?

Mr. KEEFER. With the control we are speaking of. It is regulated largely by the quantity you are going to spill.

Mr. WYVELL. With the control you have had for the last 20 years?

Mr. KEEFER. No; present control. I will probably recall Mr. Meyer and ask him a few questions on that point. Taking your maximum, which will only be reached, say, very, very seldom at 62.5, what range do you suggest from that downward, if you suggest a range at all?

Mr. STEWART. I think a range should be suggested, and I think 6 feet, making it 56.5, would be the lower limit.

Mr. KEEFER. I suppose if you fix that minimum range you may, if we get unforeseen conditions, strike a point at which you have either got to stop the sluice below or go a little below?

Mr. STEWART. It might occasionally happen, say, once in 20 or 30 years, that it would get down to 56.

Mr. KEEFER. Just as it might go to the maximum, 62.5?

Mr. STEWART. Yes; but that would be outside of the navigation season.

Mr. TAWNEY. I understood you to say that in your judgment, based on the physical data which have been presented by the consulting engineers, the maximum of 62.5 would be reached not to exceed once in 25 years?

Mr. STEWART. The computations we have show it would not exceed that.

Mr. TAWNEY. And that maximum would continue for a period of two months?

Mr. STEWART. Two or three months.

Mr. TAWNEY. Is it, or is it not, a fact that the cross-section area at the outlet of the lake could be so increased as to reduce that maximum of 62.5 in less time than three months?

Mr. STEWART. If you increase your cross section so as to discharge—I put that figure down at the discharge point, 40,000—if you increase your discharge capacity, you are going to reduce it; but you are going to create conditions in the lower river, the flood conditions with the campers down in the lower river—take the people at Minaki—

Mr. TAWNEY. That is the difficulty the commission are up against. If it continues there for three months, you are doing considerable damage.

Mr. STEWART. You will have to saw off between the two; but it is so seldom in either case that it is only a gamble, and I think it is a gamble worth taking.

Mr. TAWNEY. On what basis of discharge do you figure it would remain for three months at 62.5—40,000 cubic feet?

Mr. STEWART. I said a little while ago it might be advisable to have the discharging capacity a little larger, so that under certain exceptional conditions you might be able to discharge some more and get beyond that.

Mr. KEEFER. Does that coincide with your judgment, Mr. Meyer?

Mr. MEYER. Yes.

Mr. MIGNAULT. You say, assuming a discharge capacity of 40,000 cubic feet, the water would practically remain at the stage of 62.5 during from two to three months. I refer to this extreme stage, which would occur once in 25 years; but what I wish to understand now is that in making that computation you assume a discharge capacity of 40,000 second-feet.

Mr. STEWART. Yes.

Mr. MIGNAULT. Well, now, the discharge capacity actually is very much less than that?

Mr. STEWART. It is now, yes.

Mr. MIGNAULT. What is the discharge capacity now that would cope with conditions such as those which you have mentioned?

Mr. STEWART. I do not quite catch the drift of it.

Mr. MIGNAULT. You say that, assuming that there is a discharge capacity of 40,000 second-feet, that then this extreme stage of high-level water would remain from two to three months?

Mr. STEWART. It might get up there.



Mr. MIGNAULT. The discharge capacity at the present day is less than 40,000 second-feet?

Mr. STEWART. Yes.

Mr. MIGNAULT. What I would like to know, under present conditions, with a discharge capacity as it is to-day, how long would that extreme high level remain?

Mr. STEWART. I could not tell you that.

Mr. KEEFER. I think we will probably get that from Mr. Meyer who has made a specialty of that. Mr. Stewart does not profess to be a specialist on these things.

Mr. STEWART. I have not gone into that.

Mr. TAWNEY. When you speak of the present discharge capacity at the outlet of the lake do you mean the aggregate discharge capacity with the stop logs all out?

Mr. STEWART. Yes.

Mr. MEYER. You mean the greatest possible discharge capacity at the present day is less than 40,000 second-feet?

Mr. STEWART. If the lake goes up to a given height. Of course, at a level of 62 the cross-section of discharge would increase.

Mr. KEEFER. I think it is 5,000 for every foot of rise. I think I have, unfortunately, misled the commission, or Mr. Stewart in his answer. He spoke of three months at 62.5. I am instructed that those three months would relate more to 61 than to 62.5, and that at 62.5 it should not be there more than two or three weeks.

Mr. STEWART. Yes, that is right.

Mr. KEEFER. I think that should be cleared up.

Mr. MIGNAULT. The impression that remains on my mind is that, according to your opinion, the extreme high level would remain for two or three months, even assuming an increased discharge capacity of 40,000 second-feet?

Mr. STEWART. It would not remain at that upper limit so long as that, but it would be above the 60.5.

Mr. POWELL. The time it rose above it till the time it went down under it would be a period of about two or three months?

Mr. STEWART. Yes.

Mr. POWELL. I presume, Mr. Stewart, that anything in the way of regulation of not only Rainy Lake, but the flood waters into Rainy Lake, would also be of great value, looking after the storage there, and so forth?

Mr. STEWART. Oh, yes; of course anything that is done on the Lake of the Woods depends upon the control that is exercised over the discharge from Rainy Lake.

Mr. POWELL. It has all to be correlated?

Mr. STEWART. Yes, but the water has to be used and carefully handled. They would require all the water they can get up there, and they are not going to waste any.

Mr. POWELL. If you look at the Lake of the Woods only from the navigation point of view, I infer from your evidence, then you would destroy the other phase of the Lake of the Woods as a storage point or a place for storing water, but coupling the two together and looking at the interests of fishing and all the other combined interests you represent, if you took the ordinary maximum level of 1,060.5 and allowed 6 feet of range, you think that would be the most satisfactory way to cope with the problem?

Mr. STEWART. I think that would give about the most advantageous use of the waters of the Lake of the Woods.

Mr. POWELL. Taking into consideration all these interests?

Mr. STEWART. Yes. I do not think navigation would suffer during the navigation season.

Mr. GLENN. What is the range?

Mr. STEWART. Six feet, from 62.5 to 56.5.

Mr. GLENN. And the time you would reach the minimum, would that be the same, roughly, as the time you would be at the maximum? I am speaking of the duration?

Mr. STEWART. Down at the extreme?

Mr. GLENN. At the extreme minimum the same time as at the extreme maximum. It must be, if 90 per cent of the time it is pretty much round 60.5.

Mr. STEWART. I do not catch the drift of the question.

Mr. GLENN. I wanted to show the minimum is very rarely reached, and for a very short time, as well as the maximum is rarely reached.

Mr. TAWNEY. Ask him if the extreme range would be reached more than once in 25 years.

Mr. MIGNAULT. You can not make it too clear that these are not conditions that occur in any one year, but it is an extreme from the high level to the low level, extending over a period of 21 years.

Mr. KEEFER. Yes, and the more we get the public to understand that the more we will be content to leave it in your hands.

Mr. MIGNAULT. And the public does not understand that.

Mr. KEEFER. They all have the impression that once we have this level of 62.5 we are going to hold it there. The average camper is very timid on that point. We will get that from Mr. Meyer. They should realize that they will have the water at 60.5; that is what the evidence has been all along. When we were at Warroad in 1912 the level was practically 60.5. And I also recall—because it will give you physical knowledge of what that level is—that when we were at Kenora in 1912 it was 69.5, and when we were there last summer it was 60.5. The questions were asked “What is the level to-day?” “60.5.” So that from your 3 visits there you have a practical view, as Mr. Casgrain, the former chairman, would say of the locus in quo. You have a physical view of what that level is, and understand that we are not groping in the dark.

Mr. TAWNEY. You state that the extreme maximum range would occur, as I understand you, once in about 25 years. What would be the mean level during the greater part of the time, based upon such information and data as you have had with the regulation of the lake intended to keep the extreme maximum and minimum at a range of 6 feet? What would be the mean level during the greater part of the time?

Mr. BERKMAN. Would you include the two methods of regulation in the question?

Mr. TAWNEY. Under either or both methods proposed by the engineers?

Mr. STEWART. It would come to about a little less than 1,060; during the summer months it would range, perhaps, 6 or 8 inches from the 60.5. Of course, those few years it would go for a little bit above 60.5, while the discharge was heavy and the sluices were all open.



Mr. KEEFER. Any fixing of those figures as a range does not involve, does it, from Canada's point of view, any determination not to pay compensation for any person that can show damage?

Mr. STEWART. No; I think that is only reasonable; if anyone can show damage the Canadians would be willing to have them recompensed or compensated.

Mr. KEEFER. With regard to any works that might be necessary to be constructed within the boundary limits of Canada to carry out the range that the commission may fix, what do you say about that as regards Canada taking care of that?

Mr. STEWART. That would be an answer to question 3 of the reference the commission is asked to answer.

Mr. KEEFER. Yes.

Mr. STEWART. I think it would be compulsory upon Canada to do its share of the work.

Mr. KEEFER. So that you are speaking for Canada as a witness, and in every way Canada is prepared to do whatever is necessary to be done to carry out the direction of this board?

Mr. STEWART. That is my opinion. I would like to say that since the Norman Dam, since 1898, which is a period of 16 or 18 years now, the level of the lake has been up to the summer level of 1,060.2. I believe round the shore the navigation men and the power men at the outlet have been using that level for a long time, and to change it now might be a matter for consideration.

Mr. MAGRATH. Are you referring to the possibility of vested rights?

Mr. STEWART. Well, to some extent.

Mr. POWELL. The other people would regard it as a vested wrong.

Mr. STEWART. I think on the south shore all of the people came there since 1898.

Mr. LAIRD. Would that apply to the plants below the outlet? Would that same remark apply to the plants that have been constructed down the river?

Mr. STEWART. They have been constructed with the present conditions, but the flow has not been properly regulated. It has been under control, but not with the idea of keeping it at all steady. The control has been exercised more to keep the level of the lake nearly constant.

Mr. CAMPBELL. That possible minimum of 56.5 would likely be reached, when reached, in the winter season?

Mr. STEWART. Yes; and would cover probably a foot before the opening of navigation; that is to say, the minimum during the season of navigation, in the early opening of navigation, would be 57.5 to 58.

Mr. CAMPBELL. And the navigation period of the preceding summer would be about a foot higher than the height of water; during the navigation period of the preceding summer it would be about a foot—

Mr. STEWART. No; during the summer the water would come up after June to 60.

Mr. CAMPBELL. I am not speaking of the next season, but this low period will be the winter of the last of two or three dry years?

Mr. STEWART. Oh, yes.

Mr. CAMPBELL. But the height of water during the navigation season of the preceding summer, preceding this last low-winter level, would be some inches, 9 inches or 12 inches, higher than the minimum?

Mr. STEWART. Oh, yes.

Mr. KEEFER. Mr. Taylor, who represents the campers, has just come in. Might I suggest that he be requested to get the drift of Mr. Stewart's evidence, to lay it before his clients as early as possible.

Mr. BERKMAN. I have no questions.

Mr. WYVELL. You are aware, are you not, that since the Army reports of the War Department considerable dredging has been done in and about Warroad by the War Department—since the Army reports referred to by Mr. Keefer in the early part of your testimony?

Mr. STEWART. Yes.

Mr. WYVELL. And you were at Warroad when Maj. Peak testified last September?

Mr. STEWART. Yes.

Mr. WYVELL. And you are aware that he stated that the full and complete and efficient use of Warroad Harbor could be had at a level of 57.6; that is the fact?

Mr. STEWART. I saw it in the evidence since I came up here.

Mr. WYVELL. And at that level a satisfactory turning basin could be established at Warroad Harbor, and a channel eight feet deep cut out into the lake?

Mr. STEWART. Yes.

Mr. WYVELL. Why, then, is there any necessity, as far as navigation interests are concerned, for any level higher than 57.6?

Mr. STEWART. Well, that is not the only place in the lake; there are lots of other places.

Mr. WYVELL. Kenora Harbor is very deep, is it not?

Mr. STEWART. Not at the wharves.

Mr. WYVELL. How deep is it at a level of 57.6?

Mr. STEWART. As the evidence showed last fall at Kenora that when the water got below 1,059.5 they had a good deal of difficulty in various channels approaching Kenora. Amongst the islands the channels are very narrow. There has been no good hydrographic survey made of the Lake of the Woods yet, and I do not know the details, but I know the boatmen complain that they have difficulty.

Mr. WYVELL. Through some of the channels?

Mr. STEWART. Yes. I did not know the corps of engineers had taken the datum at Warroad until I saw that in the book the other day.

Mr. MARSCHALK. Do I understand that in your opinion 60.5 above sea level datum would be the most advantageous level for navigation purposes?

Mr. STEWART. Between 60 and 60.5.

Mr. MARSCHALK. And that is considerably higher than the ordinary level in the last 21 years?

Mr. STEWART. No. The mean summer level since 1898 has been 60.2.

Mr. MARSCHALK. But you do know, or do you know, that prior to the construction of the so-called roller dam navigation was maintained on the Lake of the Woods to a much larger extent than it is at the present time without any difficulty?

Mr. STEWART. I would not like to say that, because in 1887 a request was made of the Canadian Government to do something to improve conditions and it was on that request that the rollerway dam was constructed. The Canadian Government advanced \$7,000 to do the work,



and they would not have done it if navigation interests had not asked for it, and then again in 1898 the navigation interests approached the Ontario Government and asked them to so manipulate the stop-logs in the Norman Dam as to keep the water up higher than it was then and improve conditions at that time.

MR. MARSCHALK. But going back prior to the construction of the dam, navigation and logging was successfully carried on on the Lake of the Woods?

MR. STEWART. Well, business then must have been pretty small, but they were not satisfied when they asked for an improvement. That improvement was not done by any power interest or anyone else, except at the instance of the navigation people.

MR. MARSCHALK. Would you state that navigation interests prior to the construction of the roller dam were larger—

MR. STEWART. I do not know.

MR. MARSCHALK. Were you familiar with conditions existing at the mouth of the Rainy River?

MR. STEWART. No, except the evidence we have had before the commission. I know the public works department has done a lot of dredging there.

MR. MARSCHALK. You do not know that any soundings were made at the mouth of the Rainy River prior to the construction of the roller dam?

MR. STEWART. No, I have not been there.

MR. WYVELL. Something was said in your direct testimony by Mr. Keefer to the effect that when we were at Warroad the level was about 1,060.5. I will ask you to examine the sheet showing the levels for 1915 in order to ascertain what the level was approximately during the latter part of June and early in July, 1915. As a matter of fact, it was about 61.8 or 61.9, was it not?

MR. STEWART. It was according to this graph; it shows that.

MR. WYVELL. And that was about the time the campers mentioned it as being so high that it interfered with their pleasures and enjoyments?

MR. STEWART. Yes; Mr. Keefer was not speaking about that time, but he was speaking about the time we were at the hearing.

MR. KEEFER. On page 30 of the evidence Mr. Powell asked what was the level, and Mr. Meyer said: "The level to-day is practically 1,060.6"; and the same thing applies to Kenora the different times we were there.

MR. WYVELL. Do you see any serious objection to having a range of levels of 5, with the ordinary maximum and ordinary minimum, realizing, of course, that at periods of time the levels will likely go below and above that point, instead of taking an extreme range of levels of 6 feet? Do you not think it would be more easily understood, at any rate, by the people most concerned, if a plan were adopted whereby the ordinary maximum would be established and an ordinary minimum 5 feet less than that, and an effort made to confine it within the 5 feet, realizing that it would not be always possible to do it?

MR. STEWART. I think that would lead to endless trouble.

MR. WYVELL. Would it not better describe the conditions that would exist about 90 per cent of the time?

Mr. STEWART. No, I think it is far better to fix the extremes to which it is to go.

Mr. WYVELL. Do you mean to say, as a matter of fact, that the water could not have been confined within a range of 5 feet for 90 per cent of the time?

Mr. STEWART. Ninety per cent of the time, yes.

Mr. WYVELL. It could be confined within a range of 5 feet?

Mr. STEWART. Yes.

Mr. WYVELL. Would that not be better?

Mr. STEWART. Every time they got outside of that you would have complaints and litigation.

Mr. WYVELL. With the understanding that an ordinary maximum, if fixed——

Mr. STEWART. We want the outside limit.

Mr. WYVELL. I was only dealing with what I consider to be the opinion of engineers. I confess my mind has been running along the 5 feet.

Mr. POWELL. Mr. Wyvell may take the view that if a high maximum was fixed they might be working up as close to that as possible.

Mr. WYVELL. I think in that case some interests might let the minimum take care of itself.

Mr. KEEFER. If you fix the ordinary maximum, that might control it.

Mr. ROCKWOOD. May I make one suggestion while we are at this very point. On our side of the line possibly the rules of compensation in eminent domain may be a little more strict, and possibly the rights of property owners, after that right has been exercised, may be a little more precise because of our constitutional provisions. Now, it seems to me that there is a great deal of force in the suggestion that while we know and agree that an ordinary range will of necessity be within, say a belt of 5 feet, and the upper line of that belt below the maximum, yet, in eminent domain proceedings, fixing exactly the rights which are taken from riparian owners, it is necessary to fix a maximum and acquire the right to maintain the water at that maximum, although we know that it can not be done. In other words, I have been unable, in my mind, to justify in any strict legal, exact way——

Mr. POWELL. This is all proper when you come to address us at the close.

Mr. ROCKWOOD. I think so; I wanted to suggest it now.

Mr. TAWNEY. It is a matter of argument.

Mr. MIGNAULT. In other words, Mr. Rockwood, you would suggest that the right be acquired by process of condemnation to overflow lands to the extreme high level which might occur at any time, so that there would be no possible complaint and no possible injury?

Mr. ROCKWOOD. Exactly that, Mr. Commissioner.

Mr. BERKMAN. Mr. Stewart, are you acquainted with the conditions of the Falkland Island Narrows?

Mr. STEWART. No, Mr. Berkman, I am not.

Mr. BERKMAN. Do you know whether or not boats can go through the Falkland Island Narrows?

Mr. STEWART. I do not.

Mr. BERKMAN. The testimony that was adduced at Kenora indicated that the trouble was that they could not get through there with



tows 250 feet wide unless the water was high so as to cover the island; that they would have to divide their tows in going through.

Mr. STEWART. That might be.

Mr. BERKMAN. Now, it could be ascertained, could it not, what it would cost to blast off the top of these reefs so they could go through there?

Mr. STEWART. Surely; that is only a matter of investigation.

Mr. BERKMAN. Has your department ever considered that in the interest of navigation?

Mr. STEWART. No.

Mr. BERKMAN. And the same thing would be true as to the Whitefish Narrows and Bishops Bay?

Mr. STEWART. It is a question of survey.

Mr. BERKMAN. In Bishops Bay they could be blasted off to a certain depth and the debris allowed to fall alongside?

Mr. STEWART. That is a question of expense.

Mr. BERKMAN. In regard to Bishops Bay, Mr. Hooper testified about some trouble in that they had to go around there. You do not know anything about that, do you?

Mr. STEWART. No; I do not.

Mr. BERKMAN. It is also said that Shoal Lake is not a part of the Lake of the Woods, but that it is higher.

Mr. STEWART. Sometimes it is higher and sometimes it is lower.

Mr. BERKMAN. Now, I want to call your attention to the index map of the Lake of the Woods. Is it not a fact, Mr. Stewart, that the tows could be taken from the mouth of Rainy River across the Lake of the Woods, following the line marked as the boundary line between the United States and Canada, to the point where the boats would go between Oak Island and Birch Island, and in this way avoid the Falkland Narrows and the trouble at Bishops Bay?

Mr. STEWART. If you take tows of logs out through the Lake of the Woods there, I can imagine that with the westerly wind or the southwest wind, which in this country are the prevailing winds, the vessels would rather keep in sheltered water as much as possible.

Mr. BERKMAN. But they could be taken across there all right and thus avoid those troubles?

Mr. STEWART. I do not know about that. I have not been through those islands. There has been no hydrographic survey made.

Mr. BERKMAN. If the lake were deep enough across there so that boats could go, they could be towed across there?

Mr. STEWART. Of course.

Mr. BERKMAN. And the trouble with respect to Falkland Narrows and Bishops Bay would be avoided?

Mr. STEWART. It could be. The pilots, no doubt, have good reasons for going the way they do.

Mr. BERKMAN. Then, this class of navigation is not such that you think it could be taken across the open lake?

Mr. STEWART. It could be, but as a general rule vesselmen towing rafts would rather keep in shelter. Twenty-five miles is a pretty long run for rafts going a few miles an hour.

Mr. BERKMAN. Going around Falkland Islands or through them would make a farther pull, would it not?

Mr. STEWART. Yes; but if there is no sea running they can make much better time.

Mr. BERKMAN. You know, do you not, that Davys Rock is located about 150 feet from an island?

Mr. STEWART. It is, I believe.

Mr. BERKMAN. And you know also that by going in the way we have indicated, along the international boundary line between Birch Island and to the west of Davys Rock, they can pull around it with their tows?

Mr. STEWART. I do not know that from personal knowledge. I say that I have not been through there and I have not seen any surveys.

Mr. BERKMAN. When you get to Konora it is a fact, is it not, that the big steamers, when they get within 6 or 8 miles of Kenora, tie up their tows between the islands and then go back after another tow and then they divide the tows and haul them into the mills?

Mr. STEWART. I have not been stationed on the Lake of the Woods and I have not done any work there.

Mr. BERKMAN. You do not know whether that practice is followed or not?

Mr. STEWART. No; my investigations are confined to the question of levels.

Mr. MARSCHALK. Do you not know that it is a fact that practically all tows from Rainy River points going down to Kenora do not pass through Falkland Islands but go between Birch Island and Oak Island?

Mr. STEWART. I do not know that. I have no personal knowledge of that.

Mr. MARSCHALK. Well, such is the fact.

Mr. BERKMAN. With respect to navigation, outside of the boat *Kenora* which the owners testified it did not pay to run with a subsidy of \$10,000 a year, do you know of any boat that carries freight on a schedule on the Lake of the Woods?

Mr. STEWART. I do not.

Mr. BERKMAN. Do you know of any boats that carry freight in their own bottom?

Mr. STEWART. I do not.

Mr. BERKMAN. As a matter of fact, you have seen freight carried into Kenora on barges, have you not?

Mr. STEWART. No. I have been at Kenora very seldom. I have made the passage from Kenora to International Falls on the *Kenora*.

Mr. BERKMAN. If it were not for the danger from the winds it would be feasible to tow across the lake, would it not?

Mr. STEWART. I should imagine so. I have no hydrographic survey, but it is deep water, so far as I know.

Mr. BERKMAN. From the testimony we heard at Kenora it would mean that instead of taking a tow 250 feet wide they would have to take one smaller to get through these narrows.

Mr. STEWART. I have seen that done on the Great Lakes. You have to always fix your raft to suit the conditions you are going to encounter.



MR. POWELL. Just one or two questions, Mr. Stewart, to summarize your testimony. As I understand you, you think that it is desirable to have a range of levels, the higher level not to exceed 1,062.5?

MR. STEWART. Yes, Mr. Powell.

MR. POWELL. Now, I also understand you to be of the opinion that during the summer months, while we have this range of levels, it is desirable not to exceed 1,060.5?

MR. STEWART. Yes.

MR. POWELL. And that this would be the objective point, so to speak, between the two extremes.

MR. STEWART. Yes.

MR. POWELL. You also think that the object of the controlling board, if we establish a controlling board, should be to keep it during the period of navigation as close to that point as possible?

MR. STEWART. Close to 1,060.5.

MR. POWELL. And to exceed it as little as possible?

MR. STEWART. Yes; and to exceed it as little as possible. The trouble would be that the discharging capacity would be limited to about—

MR. POWELL. I am coming to that. In accomplishing this object you say that at times there would be likelihood of the water rising above 1,060.5, notwithstanding the efforts of the controlling board to prevent that?

MR. STEWART. Yes.

MR. POWELL. I understand you correctly, then?

MR. STEWART. That is right.

MR. POWELL. You say that to lessen the possibility of the evil the only thing to be done would be to enlarge the outflow?

MR. STEWART. Yes.

MR. POWELL. We are correct there?

MR. STEWART. Yes.

MR. POWELL. You also say that in considering the question of enlarging the outflow of Kenora there are certain conflicting interests. There is the interest of those who have summer resorts below on the Winnipeg River on the one hand, those who have summer resorts on the Lake of the Woods on the other, and also the interests of the landowners at the southern end and along the sides of the Lake of the Woods.

MR. STEWART. And the power interests at Kenora.

MR. POWELL. You say that in considering the question of increased discharge at the foot of the lakes we are faced with the question of compromise.

MR. STEWART. To a large extent, Mr. Powell, yes.

MR. TAWNEY. Mr. Stewart, in suggesting the ordinary maximum of 1,060.5, have you taken into account the wind and wave effect, especially along the south shore of the lake?

MR. STEWART. That is something that I think you can not take into account. That is something that will occur anyway. The wind may raise the lake at any time.

MR. TAWNEY. You have not taken it into account?

MR. STEWART. No; there is no allowance made for that.

Mr. TAWNEY. Do you not think that to a certain extent it ought to be taken into account, either in the assessment of damages or in connection with the permanent ordinary maximum level?

Mr. STEWART. At 1,062.5 we allow for a lot, except for the few years of the occasional rise to that point. That 1,062.5 will be reached, perhaps, once in 20 years—that is an outside limit—and that 2 feet of excess storage will take care of that. It would be very rarely that the wind would ever cause trouble. That would be a visitation of Providence.

Mr. KEEFER. May I follow up your question, Mr. Tawney? Mr. Stewart, your compensation would cover that, would it not? You would not be expropriating actually at 1,062.5? You would have to expropriate a little above that?

Mr. STEWART. That has not been brought out.

Mr. KEEFER. But necessarily compensation would cover that. You would have to take to 1,062.5, would you not?

Mr. STEWART. That would be the new high-water mark.

Mr. KEEFER. Therefore, that high-wind action, etc., up to the time it was not standing at 1,062.5, you would cover by your compensation?

Mr. STEWART. Yes.

Mr. TAWNEY. In reporting on the land submerged I think it is the duty of the commission to take into consideration the wind effect at the level which may be recommended, and consider the land that would be submerged—

Mr. KEEFER. As the contour for condemnation.

Mr. TAWNEY. Or for the value of the land that would be submerged—

Mr. KEEFER. It is just on that point that I am unable at present to offer you land damage evidence. Once we knew what your land contour condemnation was going to be we could then give you the evidence of what the seepage is from such and such a point, etc. So far as Canada is concerned, we are quite willing that you should take the estimates of your consulting engineers, in whom we have implicit confidence, because they will be the ones to probably advise you what this range is going to be. They will also be the ones to advise you over and above that range what will be the contour for condemnation. They might just as well say that covers so many acres, and, according to the testimony that we have heard, we would suggest that you fix such and such as the value. Later on that question of value has to be taken up in detail when the actual compensation comes to these people.

I would like now to ask Mr. Meyer some questions. Mr. Meyer, you have been listening to the testimony of Mr. Stewart, and we have been suggesting from the viewpoint of Canada an ordinary maximum level of say 1,060.5. Your other necessary data for computation, I understand, would be the volume of outflow. We have been assuming that you should have that fixed at say 40,000. Taking those two figures for your basis of computation, I would like you to tell us to what level the water would rise above 1,060.5, how often it would reach that point, and how long it would stay there at the maximum level, according to your last 21 years' experience or study of the data?

Mr. MEYER. On the basis of those assumptions and, of course, without expressing any conclusion with respect to concurrence or non-



concurrence in the desirability of the 1,060.5 as the ordinary maximum, I would say that the water would have risen above the 1,060.5 in three years out of the past 21 years, namely, in 1896, 1897 and 1899.

Assuming that the upper Rainy Reservoirs had been regulated according to method B and the Lake of the Woods outflow according to method A, the maximum increase above the 1,060.5 would have been just about 1 foot, bringing the maximum during this period of 21 years to 1,061.5. It would have remained between 1,060.5 and 1,061.5 over a period of approximately three months, remaining at the extreme upper limit, however, for only a few weeks, gradually approaching the high point, and then gradually dropping off again to the ordinary maximum.

Mr. KEEFER. I would like you also to take the converse and give us its relation to the low or minimum on that range suggested.

Mr. POWELL. What minimum?

Mr. KEEFER. The range suggested, 1,056.5.

Mr. MEYER. The minimum is, of course, governed entirely by the rate of discharge from the lake. Assuming a rate of discharge of 9,260 cubic feet per second as a minimum, the level would have been within about half a foot of 1,060.5 for 90 per cent of the months of June, July, August, and September. It would have fallen to 3.8 feet below that level, or substantially so, twice, namely, in the fall of 1911 and in the spring of 1912, the maximum draft on storage being 5 feet and occurring on the 1st of April, 1912, just before the spring run-off came into the lake. There is a possibility, of course, of the maximum draft in the spring of the year being greater than 5 feet, if we assume a higher rate of continuous discharge for power purposes when considering a longer period of years. It is probable that the minimum previously indicated would have fallen below that point during the dry spell of the late eighties. It is also probable that the maximum, namely, 1,061.5, would have been exceeded possibly by 1 foot or so during the wet period of the late seventies. The amount that the lake would rise above the ordinary maximum level is not definitely determined by the method of duration or regulation, that is method A or method B. The probability is, however, that under method A and considering a long period of years, the lake would rise somewhat higher than under method B. It is a fact, however, so far as the minimum is concerned, that considering the records at St. Paul and Minneapolis the low rainfall of 1910 had not been reached in any other year since 1837, so that it is possible that the minimum in 1911 and 1912 may, after all, on account of the distribution of precipitation, be fairly close to the minimum that might occur over a longer period of years, although if a definite, absolute minimum were determined upon, that minimum could not physically be maintained because the inflow from Rainy Lake and the adjoining watershed under method of regulation B would be insufficient to supply any evaporation from the lake surface, even though not a drop of water were discharged at the outlet.

Mr. KEEFER. Mr. Meyer, speaking of the discharge at the outlet, and following up Commissioner Powell's question as to the difficulty facing the commission so far as the campers below and the campers above are concerned, is there not another important factor to take

into consideration if you try to lower this lake too rapidly and increase the flow down below in the river? For instance, the power interests, how are they affected if you rapidly pour in too much water there?

Mr. MEYER. The power interests on the Winnipeg River below the outlets are rather seriously concerned with high rates of discharge because the tail water is raised and the head reduced. It is not an uncommon thing on large streams to find that the minimum power is determined by the flood flow rather than by the low water flow, because the amount of water that can be discharged by a turbine, which is merely a special form of an artifice, varies with the head, so that not only is the head reduced, but the quantity of water that can be used by a given set of turbines is also reduced; so that the reduction in power is more than proportional to the reduction in head.

Mr. KEEFER. Taking those factors into consideration, is a 40,000 cubic feet per second flow a reasonable one to consider as a suggestion?

Mr. MEYER. It would appear to me that 40,000 is about as high as the discharge should be at the ordinary maximum level. We have assumed, of course, that the discharge would increase with the lake level, and the rate of increase is approximately 4,000 or 5,000 cubic feet per second for every increase of 1 foot in lake level.

Mr. KEEFER. Have you stated how often that would reach the 1,062.5, according to your studies?

Mr. MEYER. According to our studies, that would not have been reached during the past 21 years, and may possibly never be reached in the future, while it may occur inside of 10 or 15 years, although the methods of regulation considered in our report are rigid and can not be based upon a forecasting of what the probable inflow will be, and if the operating board considers what the snow-fall was during the winter and what the probable spring run-off will be, it will be possible to draw the lake down below the ordinary maximum so as to provide for the absorbing of part of that spring run-off and in that way very probably substantially reduce the high point to which the lake may rise and without question reduce the length of time over which that high period would extend.

Mr. GLENN. Mr. Meyer, has that not substantially been gone over by you before? I know that you are now simply answering questions that are put to you.

Mr. MEYER. I do not think we have previously summed it up in the way I have done at this time.

Mr. KEEFER. Then, Mr. Meyer, if the average ordinary maximum was increased say to 1,061, would we reach the 1,062.5 stage at all, according to your studies?

Mr. MEYER. We would not have reached it during the past 21 years.

Mr. KEEFER. Even if the ordinary maximum is put at 1,061?

Mr. MEYER. That is correct under the method of regulation and the other assumptions indicated.

Mr. KEEFER. I am told that I may have failed to make my questions entirely plain. At all events, your answers are applicable to all those powers down the river there?



Mr. MEYER. That is a general condition that obtains at every water power with which I am familiar; the tailwater rises more rapidly than the headwater. In the case of natural falls that rise is sometimes very nearly equal, that is, the rise in headwater is sometimes very nearly equal to the rise in tailwater.

Mr. KEEFER. It would have the same effect upon the powers at the outlet also?

Mr. MEYER. Oh, yes; exactly. The consulting engineers for the commission would like to have the city of Winnipeg plant and the street railway plant submit to them figures indicating the monthly consumption of power, so that we may determine whether or not the demand for power is so much greater in the wintertime as to make the true minimum occur at that time rather than at the time of the maximum flow and minimum head as indicated in my previous reply.

Mr. KEEFER. And that would modify, to a certain extent, the meaning?

Mr. MEYER. Yes; quite so.

Mr. KEEFER. Now, I would like you to get down to my level on this problem and for the benefit of these campers and the rest of us give us a rough estimate of what the levels would be and some idea of their duration. For instance, take the ordinary maximum of 1,060.5, what percentage of the time would the water be standing there over a period of 21 years, in the summer time particularly?

Mr. MEYER. Considering a range of about half a foot in levels, I would say that the level would remain within that range about 90 per cent of the time during the summer season, June, July, August, and September.

Mr. KEEFER. What percentage of the time would it be a foot higher than that?

Mr. MEYER. That might be 1 per cent or less than 1 per cent of the time, representing possibly three or four weeks out of the 21 years.

Mr. KEEFER. And never would that reach, according to your estimation, the 1,062.5?

Mr. MEYER. It would not have reached it during the past 21 years, although, as previously indicated, considering the greater range of natural phenomena, we might reach it in the future; in fact, in the near future; no one can accurately foretell what will happen.

Mr. KEEFER. If you have arrived at some question of contours and levels, would it not be advisable to delineate these on the lands so that the farmers would know hereafter what the true situation is, instead of having this uncertain testimony whenever the waters have risen above it?

Mr. MEYER. I would say that it would be desirable to monument the line up to which the rights have been acquired, so that anyone may know without requiring a survey approximately what the elevation of the water is, or at least determine the fact that it is not up to the line to which rights have been secured.

Mr. KEEFER. By "a monument" I presume you mean a concrete monument, for instance?

Mr. MEYER. Some visible monument of concrete or tile or iron pipe, possibly, every mile or so along the shore.

Mr. WYVELL. Mr. Meyer, do the power plants on the Winnipeg River have their greater load in the summer or winter?

Mr. MEYER. The greater load is in the winter.

Mr. WYVELL. A decrease in output due to an increase in the discharge from the lake would, of course, always occur in the summer, would it not?

Mr. MEYER. Yes.

Mr. WYVELL. Therefore, the ultimate loss to the power interests there on the Winnipeg River would be only a real loss provided that each power plant had consumption for all of its power during the summer?

Mr. MEYER. The loss would be determined by the peak load capacity of the plant, and that would be governed by the amount of water which the plant could discharge under the reduced head.

Mr. WYVELL. And the peak load capacity is in the winter at present?

Mr. MEYER. The peak demands are in the winter.

Mr. WYVELL. And, therefore, the loss resulting from the increased discharge would only be real provided there was demand for such capacity during the summer?

Mr. MEYER. If I get your question correctly, I think that is true. The data that I have asked for will determine that fact.

Mr. WYVELL. When you were talking about the percentage of the time that the water would not rise over 1,060.5, you were talking about ideal conditions of control?

Mr. MEYER. I was speaking then of not ideal conditions, but the method here specified of certain regulations; that is, method B on the Upper Rainy reservoirs, and method A on the Lake of the Woods, without any attempt at forecasting what the inflow would be in the spring.

Mr. WYVELL. I mean with regard to these two methods; we will say that they should be ideal.

Mr. MEYER. I would consider that those methods merely represent the rigid application of the definite principle and can be readily improved upon in actual operation.

Mr. WYVELL. In the carrying out of that principle plan A and plan B, in order to obtain the result to which you have testified, they must be perfectly worked out?

Mr. MEYER. Yes.

Mr. WYVELL. Because I have noted from your table, on page 186, that during the 21 years which your studies cover the rise above 1,060.5 occurred in 14 of those years.

Mr. MEYER. I might say that the regulation that we have been considering would appear to result in an average reduction in lake levels of about 1 foot, according to the curve I have in this book of graphs, which is not printed, however; the reduction varying over the year and depending somewhat upon the method of regulation, the present regulation having been with a view to keeping the lake level up to a fairly uniform point, namely, about 1,060.8, without reference to equalizing the discharge.

Mr. WYVELL. Mr. Meyer, the efficiency of the use of the water at the power plants on the Winnipeg River depends entirely upon the amount and uniformity of the flow, does it not?

Mr. MEYER. Yes, sir. I do not desire to burden the commission, but there is just one matter that I think I should mention and which



will take me less than five minutes—depending upon the speed with which the reporter can make his pen go—to call attention to. Some of the interests I think should have it under consideration previous to arguing this matter before the commission. I refer to the question of the effect of the lower levels which may occur during periods of dry seasons on the power plants at the outlets. We have been considering that question for several months and all came to the tentative conclusion that it might be desirable to enlarge the western outlet merely with a view to regulating the lake levels and not with a view to developing power; and that if it were desirable to install a manufacturing plant in this vicinity on account of the convenience of bringing in raw material, it might be desirable to develop a water power next below the outlets on the Winnipeg River and transmit the electrical energy up to that site and use it there by motor-driven instead of direct-connected machinery. In that event current could be drawn from the same transmission line to supply the other plants at the outlets when these plants might not be able to operate at all or even economically on account of the low level of the lake during a period of dry years.

Mr. KEEFER. Mr. Chairman, that is all the evidence that we are going to offer you. I am sorry that last night I said we would take only half an hour. We have been an hour and a half, as usual.

There is one other point that I think ought to be explained. I have been speaking to Mr. Taylor about it. If he is not able to get the information I can get it from the Government of Ontario, namely, the question of chain reservation on the shore allowance. I do not know what it is myself; but I am quite sure those large islands have that chain allowance, such islands as Coney Island, which would cover that beach question.

Mr. ANDERSON. I called Mr. Kensit yesterday afternoon to give you some idea of figures, including capital invested depending upon cheap power in Winnipeg, etc. Mr. Kensit prepared a great deal of material and, naturally, in the short time he was on the stand he could only give a very brief synopsis of it. He could elaborate very much more on that, but the report is in the hands of your consulting engineers and, therefore, I assume that full use may be made of any information contained therein. Otherwise, I would suggest that he might be recalled to give a fuller statement.

Mr. POWELL. You might put it in evidence and whether it shall be printed or not will be a matter for our discretion.

Mr. KEEFER. Mr. Anderson says the engineers have been furnished with the data.

Mr. Taylor, will you state what you know about this question regarding the reservation of a chain allowance?

Mr. TAYLOR. I am informed that the reservation applies only to islands of 30 acres or upward. I know that in the case of my own island there is no such reservation, and I think in all the smaller islands you will find it does not exist. I understand, further, that the Crown will not in any case part with the title to that reservation to anyone except the owner of the island. That is true, even if he has not made an application to purchase it.

Mr. POWELL. What is the reservation; the title to the soil?

Mr. TAYLOR. I suppose it is intended for navigation purposes.

Mr. POWELL. It is simply a public easement, or does the Crown actually reserve the soil?

Mr. KEEFER. It actually reserves the soil.

Mr. TAYLOR. In actual practice the owners have the islands and enjoy them perfectly.

Mr. ANDERSON. I happen to know something about that. I acquired a piece of land down in the Minakee district the other day. I do not know that the reservation is limited to islands of 30 acres or more, as Mr. Taylor suggests. In my case I acquired a piece containing 5 or 6 acres. It had water frontage on both sides and a reservation of 66 feet wide was contained in the patent.

Mr. KEEFER. That is in the Ontario patent. I do not know about Manitoba.

Mr. ANDERSON. The policy seems to be to reserve a public highway of 66 feet wide upon a water front, and I think it would be well on that point, perhaps, to have a reference to the actual statute or rule governing that. If it is a matter of regulation we ought to put the regulation in.

Mr. KEEFER. I will have that put in.

Mr. POWELL. I suppose it is for a more beneficial use of the land by the public.

Mr. ANDERSON. That is it.

Mr. TAYLOR. I may say that the information I have had more particular reference to the islands in the Lake of the Woods which have been alienated some time ago.

Mr. KEEFER. It is also applicable to Winnipeg. In Ontario it is our law that chain allowance is reserved anywhere along the shores of navigable waters. Mr. Taylor, you have heard the evidence of Mr. Meyer, which is confirmatory of that given by Mr. Stewart. If there is anything further that we can furnish to your client we would like to satisfy you. We would like you to realize that we are trying to give you what you have been asking for. It is impossible to give you a level of 1,060.5 all the time, but 90 per cent of the time you have it there.

Mr. TAYLOR. I think that would be fairly satisfactory.

Mr. LAIRD. On the question of this reservation down the Winnipeg River, I see Mr. Richardson is here, and I think he will confirm the statement that in all the titles granted by the Ontario government down on the Winnipeg River there has been a reservation and exception from the fee in favor of the Crown of a width of 66 feet.

Mr. RICHARDSON. I understand that in the smaller islands, I think those not exceeding 10 acres, that that exception is not contained in the titles.

Mr. KEEFER. I will have a statement put in by the commissioner of Crown lands on that subject.

Mr. RICHARDSON. I further understand that the owner of the island has the absolute control, and the exception is merely made for military purposes, and that higher up the other campers have no right, as a matter of course, of landing on your island or on that strip, and that the owner has absolute use in every way of the strip for all camping purposes and for all the purposes required as an owner. The island would be useless for purposes of boathouses if it were otherwise. Improvements which the owner is expected and for the last two years has been compelled to make within a certain



length of time would not be beneficial if he did not have that absolute use of the shore. In some cases where application has been made and the environments shown to the Government, the strip has been transferred to the owners.

Mr. CAMPBELL. Mr. Chairman, two days ago information was asked for as to the height of water in the conduit of the greater Winnipeg water district. I asked the engineer this morning to get me the figures. The flow of the conduit is 1,050.8, and the height is 1,058.9, which is just 2 or 3 inches under the roof where the head of water would give the greatest velocity and carry 85,000,000 gallons per day. A height of 1,053.6 would enable the conduit to carry 25,000,000 gallons per day, which is the estimated amount requisite with the greater Winnipeg water district at the time of anticipated completion about two years hence. I am not acting for the district, but the figures were asked for the other day, and the engineer could not give them at that time.

Mr. TAWNEY. Mr. Campbell, what is the estimated population for which that 25,000,000 will provide sufficient water for sanitary and domestic purposes?

Mr. CAMPBELL. 230,000 to 270,000 population. They estimate it at 85 to 100 gallons per capita.

Mr. CAMPBELL. There was released two days ago reports from the State Board of Health of the State of Minnesota, and a special report obtained from Mr. Wolff, who, I think, is a member of or an engineer attached to that board. I have submitted Mr. Wolff's report, which refers to the cost of pumping at Warroad, to Mr. Fierst, who has verified nearly all of it. So far as he has gone he finds that Mr. Wolff has been very accurate and just. Mr. Wolff bases his conclusions upon the installation of four sewage pumping stations at Warroad. He estimates the difference in cost if the level of the water were raised to 1,062 and the town had to pay the difference.

Mr. MAGRATH. That is the difference in cost of operation; it has no reference to the cost of installation?

Mr. CAMPBELL. The installation they would have to undertake at any level, even at a natural level. This is merely the difference in cost if by reason of your recommendation a higher level is fixed. We, therefore, do not dispute that and will not call any evidence on it.

Mr. MAGRATH. The consulting engineers would like to get some information regarding the cut of pulp wood in the upper watershed of these waters. Mr. Rockwood has already promised to assist as far as he can. If you other gentlemen can lend any assistance in that regard, it will be appreciated by the engineers.

Mr. ANDERSON. Mr. Chairman, I want to put in evidence a copy of the water-power regulations of the Dominion Government.

(The copy of the regulations referred to was marked "Exhibit No. 20.")

Mr. MAGRATH. Mr. Berkman, I understand that you have a couple of affidavits to offer?

Mr. BERKMAN. We offer two affidavits of Helic Clementson in regard to water power on the Rapid River and the damage that would be done to his mill site if a higher level than 1,060 is maintained.

Mr. POWELL. That river flows into the lake?

Mr. BERKMAN. Yes.

(The two affidavits offered in evidence by Mr. Berkman are as follows:)

CLEMENTSON, MINN., *January 27, 1916.*

To the Honorable INTERNATIONAL JOINT WATERWAY COMMISSION, United States and Canada.

Amount of damage to the water power on Government lot 3, town 160, range 30, Rapid River watershed, is about 700 square miles.

Height of low water stage above Falls is about 1,060 feet and level of Lake of the Woods is natural at 1,057 feet above sea level, United States Geological Survey. Above 1,057 feet level will depreciate value of above said power to the approximate amount of \$45,000.

HELIC CLEMENTSON.

Subscribed and sworn to before me, a notary public, this 27th day of January, 1916.

EDWARD FARDER,  
*Notary Public.*

CLEMENTSON, MINN., *January 27, 1916.*

To the Honorable INTERNATIONAL WATERWAYS COMMISSION, United States and Canada.

Amount of damage to mill and yard on Government lot 4, town 160, range 30, if higher level than 1,060 feet United States Geological Survey is maintained, about \$12,000.

HELIC CLEMENTSON.

Subscribed and sworn to before me, a notary public, this 27th day of January, 1916.

EDWARD FARDER, *Notary Public.*

Mr. CAMPBELL. As to Warroad, Mr. Berkman, I understand you accept the report of Mr. Wolff also?

Mr. BERKMAN. Yes. Mr. Meyer, calling your attention to sheet 10 of the map, you are acquainted with the country tributary—that is, back from the lake and along the contours from Warroad to Mr. Landby's place?

Mr. MEYER. I am reasonably well acquainted with the strip of country that is here mapped; yes.

Mr. BERKMAN. From your knowledge of the grasses and the vegetation along the lake on the higher lands, where would you say the ordinary high-water mark would be as indicated by those grasses and vegetation as you now find them?

Mr. MEYER. The character of vegetation from my observation has changed rapidly. What in one year was a flax stubblefield, at our next visit, I believe, had cattails flags growing on it, so that just what the condition would be there now I do not know. Of course, just at this moment it would be under a cover of snow, but what the condition would be there this coming spring I presume would be reasonably similar to what it was last fall when we were there.

Mr. BERKMAN. Let us get back, Mr. Meyer, to the land as it exists in a state of nature, the nature of grasses.

Mr. MEYER. As I just indicated, in view of the fact that the character of the grasses changes very rapidly, of course it would be completely out of the question to say just what the character of the grasses and the shrubbery and the trees was in a state of nature.

Mr. BERKMAN. We are not referring now to a state of nature. We are referring to the conditions as you have observed them in the years when you have been on the survey there.



Mr. MEYER. Well, perhaps what you would like to know is approximately where we found the timber line, for example?

Mr. BERKMAN. No.

Mr. MEYER. Or the line of the willows?

Mr. BERKMAN. No. You quoted Judge Mitchell's decision as the way to determine the ordinary high-water mark. Now, if you go out there as it has existed the years that you have been making your surveys, where would you, in making an examination, say the ordinary high-water mark was regarding that vegetation?

Mr. MEYER. Under the conditions do you mean at the time of our surveys?

Mr. BERKMAN. Yes; and as they existed in 1913 and 1914.

Mr. MEYER. The Minnetonka decision refers to the point at which the water stands so long as to wrest it from vegetation, or something to that effect. That brings up the question as to just what vegetation is considered. At one point reference is made to the point up to which the presence and action of the water is so continuous as to destroy the value of the land for agricultural purposes by preventing growth of vegetation constituting what may be termed any ordinary agricultural crop, for example, hay. As I just indicated awhile ago, the change in the vegetation occurs very rapidly. I would not consider that cat-tail flags, for example, would constitute a growth that would come within the meaning of this term of an agricultural crop.

Mr. BERKMAN. Let me interrupt you. Let us get away from the cat-tail flag. We are trying to get at the natural conditions, not on a cultivated field, but the natural conditions as they exist.

Mr. MEYER. I am trying to reply to the question just as specifically as I can. I thought you were trying to determine what was the ordinary high-water mark within the time of our surveys, and I have just indicated that what in one year was a flax stubblefield was, on account of the action of the water, covered with cat-tail flags two years afterwards.

Mr. BERKMAN. You say it has no value as an agricultural crop?

Mr. MEYER. I am not speaking about values; I am speaking about the fact that cat-tail flags, in my opinion, within the meaning of the term "agricultural crop, for example, hay," is not an agricultural crop; that in some other year that same land, if the cat-tail flags were cut down, and possibly even the seeds that are in the soil perhaps from some previous year allowed to spring up, they produce a finer growth, possibly some sedges; and if the water gets down low enough and it is continually being cropped that same growth may become better; that the better grasses would get a foothold and eventually on that same land you might cultivate a crop, or that the grasses themselves might constitute an agricultural crop. But at that particular time certainly I would say that the elevation, which as I recall it was about 1,061, or possibly nearer 1,062, was about at the line of demarcation, the cat-tail flags being on the line below ordinary high-water mark and the other vegetation being above it. At that particular time and, of course, what the condition would be in a state of nature, I am unable to say, because, so far as those years are concerned, the lake being  $4\frac{1}{2}$  feet lower, there is no question but what that same land could have been cultivated where we were standing and the cat-tail flags were growing.

MR. BERKMAN. Now, we have become confused on the state of nature. What I wanted was the state of nature as the sod existed, and all the time we have been talking about the water as it was controlled. What I mean by state of nature is that you would go out there on the meadows and make the examination, whether that water that existed in 1912, 1914, or 1915 had changed the nature of the grasses there so that they would not be valuable, for instance, for hay?

MR. MEYER. If I have your question now, I would say that at that time we were out there the ordinary high-water mark—that is, the line of demarcation between the cat-tail flags and the land that could be cultivated at that particular time—seemed to be between possibly 1,061 and 1,062. I have not the exact location of that particular patch of corn where we were standing.

MR. BERKMAN. Now, let us get away from this. You know enough about agricultural crops to know that grass will not grow up in one year where it is flooded. What we want, Mr. Meyer, is to find out along in section 2 on that plate where the grasses have changed so that you would say that the ordinary high water has destroyed their value for hay or for other purposes. Now, I might say that you know that the first change would have to be cat-tails. But has that ordinary high-water mark destroyed the growth along in the northeast quarter?

MR. MEYER. Can not we limit it over here at Mr. Landby's place somewhere?

MR. BERKMAN. No; I am asking you a question direct.

MR. MEYER. But this portion in here represents land I am trying to locate. As I recall it, we were over here and we walked down in this direction here [referring to the plate]. But I do not recall that we were on this particular spot last fall. I am trying to connect up our visit—

MR. MIGNAULT. It strikes me, Mr. Berkman, that you are putting an unnecessary amount of force in your questions. It is absolutely unnecessary.

MR. BERKMAN. I will state, Mr. Mignault, that the purpose of developing this is that he has taken the instance of a cultivated field. It is the question of these grasses in a state of nature, whether the high water has existed long enough to change the nature of the grasses.

MR. MIGNAULT. I am not objecting to your questions, but to the tone in which they are put to Mr. Meyer.

MR. BERKMAN. I will apologize to the commission and to Mr. Meyer.

MR. MEYER. I am trying to answer your questions, Mr. Berkman, just as well as I know how.

MR. WHITE. Mr. Meyer has done just what any of us would do; he has picked out a piece of land with which he was particularly familiar on account of having traveled it personally, instead of taking some point along the shore.

MR. BERKMAN. Then, let us go to some point where the grasses have existed and there has been no change during the period from Adam until this time.

MR. MEYER. I indicated that on one specific field the line of demarcation seemed to have been at about 1,061. At other points it



appears to be in the neighborhood of 1,060, that line varying somewhat with the slope of the land immediately back from that contour.

MR. BERKMAN. I wanted you to base your answer on the lands that existed in a state of nature, and state whether it had wrested from nature those grasses that would have been valuable for hay, for instance.

MR. MEYER. I think there is no doubt that during the last six or seven years the lake, under natural conditions, would have been so low that large tracts here that were substantially under water or near the water's level would have been capable of yielding a crop of the lower grades of hay, varying from the water's edge up to the better grades on the higher contours.

MR. BERKMAN. Depending upon how long it would be out of water?

MR. MEYER. Exactly.

MR. BERKMAN. That is, the grasses and everything would improve?

MR. MEYER. Certainly.

MR. CAMPBELL. You are putting that over a period of the last six or seven years?

MR. MEYER. Yes; when the lake would have been possibly four feet lower than it actually was.

MR. CAMPBELL. But not going farther back than say 1908?

MR. MEYER. That is what I confined myself to.

MR. BERKMAN. Now, Mr. Meyer, during the last 9 or 10 years the lake, I think you stated, had not exceeded 1,057 except at one time; that is, for any considerable period of time?

MR. MEYER (after consulting the record). It appears that the lake would not have reached or exceeded 1,057 in the years 1909, 1910, 1911, 1912, 1913, 1914, and just about reached 1,057 in 1915.

MR. BERKMAN. The one year it exceeded it, it went to 1,058?

MR. MEYER. Previous to that it exceeded it every year since the beginning of our records.

MR. CAMPBELL. That is the computed height for a state of nature.

MR. MEYER. Yes.

MR. BERKMAN. In 16 years how many times has it exceeded 1,059 for any period of time?

MR. MEYER. Out of any 16 years?

MR. BERKMAN. During the growing season for a considerable time; that is, commencing with 1915.

MR. POWELL. The data you are asking about are all tabulated.

MR. BERKMAN. But I wanted to just call the attention—

MR. POWELL. Would it not seem to be unnecessary to have it repeated unless you are basing some question on it?

MR. BERKMAN. I will make it very short.

MR. POWELL. I am not cutting you off. I am just simply making a suggestion.

MR. BERKMAN. My purpose was to get it in the record, so that when the commissioners would peruse it it would come to their attention.

MR. MEYER. It appears to have exceeded 1,059 only in 1901 and 1905, that is during the last 16 years. This graph showing the progressive mean precipitation since 1872 will appear in the consulting engineers' report.

MR. MAGRATH. Is that all, Mr. Berkman?

MR. BERKMAN. The only other thing is this: The manager of the Keewatin Power Co. will be here, and we would like to learn whether

it is necessary to keep the lake as high through the coming season. We would like to get away from as much damage as we can by reason of high water.

Mr. ANDERSON. As I understand it, it is suggested that something could be done in the operation of the dam down there. If that is so, it would be better for Mr. Berkman to write a letter to whoever has the present control of that. I imagine that the commission has nothing to do with that at the present time.

Mr. LAIRD. Mr. Chairman, I wish to enter an objection to the introduction of the affidavits offered by Mr. Berkman, on the ground that the party who makes them was called at Warroad, was examined upon the matter to the length of eight or more pages by his counsel, and I think it is highly objectionable to receive at this late stage such affidavits from a man who has given oral testimony.

Mr. TAWNEY. Do the affidavits cover the same testimony that he gave before the commission at Warroad?

Mr. LAIRD. I do not think they do. He did not there put in any such extravagant claim as he now puts in the affidavits.

Mr. TAWNEY. I mean, is it in relation to the same subject-matter?

Mr. LAIRD. It is the same property; yes. Mr. Clementson's testimony appears at page 22 of the record.

There is another matter which I wish to direct attention to. At International Falls during the September sittings it was agreed that a statement should be obtained from the State auditor as to sales of State lands during the last period of years and filed. Upon inquiry of the secretary of the commission I am informed that that has not yet been received.

Mr. TAWNEY. That was presented to the committee of the commission at International Falls last week and it will appear in the record.

Mr. CAMPBELL. There were some details four years ago that Mr. Ralph promised to send in.

Mr. TAWNEY. We have not been able to secure copies of that report, I believe.

Mr. MEYER. Mr. Ralph did furnish us at that time with a map showing approximately where the lake level was at the time he made those land surveys.

Mr. CAMPBELL. In 1895 and 1906?

Mr. MEYER. Yes.

Mr. CAMPBELL. That was all that was indicated in the evidence?

Mr. MEYER. That is all I believe he was going to furnish us.

Mr. BERKMAN. In connection with the Rainy River Navigation Co., the company that controls the "Kenora", they promised to furnish the commission with a table of the amounts of freight and passengers they had carried through a series of years. I would like to know whether or not that information has been furnished?

Mr. BURPEE. It has not been furnished.

Mr. MAGRATH. Is that all, gentlemen?

Mr. WYVELL. Mr. Chairman, I want to put in evidence two or three documents. I will not read them, but will refer to them by title and date. I desire to offer in evidence a letter written by the Secretary of State of the United States to His Majesty's chargé d'affaires, Mr. Hugh O'Beirne, dated May 6, 1905.

I desire also to offer in evidence the acknowledgment of said letter, signed by Hugh O'Beirne, to the Acting Secretary of State, said letter being dated May 10, 1905.



I next desire to offer in evidence a letter written by the Hon. William H. Taft, the Secretary of War, to the Secretary of State, dated April 21, 1906. In order to complete all the record I desire also to offer in evidence a letter from Hon. Halvor Steenerson to the Secretary of State, dated February 12, 1906.

I might say that I have shown this correspondence to the counsel for the Canadian Government. He has read it and has no objection to it.

(The correspondence just offered in evidence by Mr. Wyvell is copied into the record in full, as follows; and see also full correspondence in Appendix C.)

*From the United States Secretary of State to His Majesty's Chargé d'Affaires at Washington.*

DEPARTMENT OF STATE,  
Washington, May 6, 1905.

SIR: In the river and harbor act of June 13, 1902, Congress adopted a project for improving Warroad Harbor and Warroad River, Minn. This project is now being carried out, the river and harbor act of March 3, 1905, having made an appropriation of \$35,000 therefor.

The improvement depends very largely upon the level of the Lake of the Woods, all the estimates for dredging the harbor and its approaches being based upon the maintenance of this level at or above the datum of 7.2 feet on the Warroad Harbor gauge. During the past year it appears that the gauge reached that reading only for the half of one day and that it fell as low as 6 feet for several days during the season of navigation. High-water mark is reported to be about 1.51 feet above this reading of 7.2 feet at Warroad.

Some years ago the Keewatin Power Co. built a dam across one of the outlets of the Lake of the Woods near Rat Portage, which dam, it is understood, subsequently passed to the control of the provincial Government of Ontario, and it is thought that the level of the lake could be easily controlled by inserting or removing stop planks in this dam. There is understood to be much Canadian navigation on the lake, as well as several water-power companies at or near the aforesaid dam, which would be benefited by the maintenance of the lake at the highest possible datum. In view of this it is suggested by the Secretary of War in his letter on this subject of the 26th ultimo that an agreement might be reached with the Canadian authorities by which the dam could be so operated as to prevent the level of the lake from falling below the datum of 7.2 feet.

I have the honor, therefore, to ask if you will be so good as to lay the matter before the proper authorities of the Dominion, with a view to reaching the suggested understanding as to the maintenance of the normal level of the lake in question.

I have, etc.,

FRANCIS B. LOOMIS,  
*Acting Secretary.*

Mr. HUGH O'BEIRNE, etc.

No. 99.

BRITISH EMBASSY,  
Washington, May 10, 1905.

SIR: I have the honor to acknowledge the receipt of your note No. 223 of the 6th instant relative to a suggested understanding with the Canadian authorities for the maintenance of the normal level of the Lake of the Woods; and I beg to inform you that I have laid the matter before the Governor General.

I have the honor to be, with high consideration, sir,

Your most obedient, humble servant,

HUGH O'BEIRNE.

The Hon. FRANCIS B. LOOMIS,  
*Acting Secretary of State, etc.*

WAR DEPARTMENT,  
Washington, April 21, 1906.

SIR: The department duly received your letter of February 24 last inclosing copies of correspondence with Hon. H. Steenerson, Representative in Congress from Minnesota, on the subject of the level of the water in the Lake of the

Woods, in connection with damages which he states have been sustained by certain settlers for whose relief he proposes making provision by legislation.

Replying thereto I beg to inform you that the War Department does not consider the present time favorable for pressing the request for action by the Dominion authorities toward maintaining the level of the Lake of the Woods at 7.2 on the Warroad gauge, as asked in previous correspondence on the subject, and prefers now that the matter be not urged further on its initiative until brought up again by further developments.

Very respectfully,

WM. H. TAFT,  
*Secretary of War.*

The Hon. SECRETARY OF STATE.

HOUSE OF REPRESENTATIVES, UNITED STATES,  
*Washington, D. C., February 12, 1906.*

Hon. ELIHU ROOT,  
*Secretary of State.*

DEAR SIR: On April 26, 1905, Gen. A. Mackenzie, Chief of Engineers United States Army, addressed a letter to the Secretary of War setting forth that by act of Congress of June 13, 1902, an appropriation had been made of \$35,000 for improvements of the harbor at Warroad, Minn., and that the improvement depended largely upon the level of the water in the Lake of the Woods, the dredging and estimates being based upon a 7.2-foot datum on the Warroad harbor gauge; and that in the late years the stage of water has very rarely reached that point and that it frequently fell during the season of navigation to 6 feet. It is further stated that the Keewatin Power Co., of Ontario, built a dam across the outlet of the Lake of the Woods near Rat Portage which dam it is understood subsequently passed to the provincial Government of Ontario and that the level of the water in the Lake of the Woods can be controlled by inserting or removing stop planks in this dam. There is much Canadian navigation on the Lake of the Woods, as well as several water-power companies which would be benefited by a maintenance of a high level of water in the said lake, and in view of this fact it is believed that an agreement might be reached with the Canadian authorities by which the dam could be so operated to prevent the level of the Lake of the Woods from falling below the datum of 7.2 feet.

The letter closes with a recommendation that the Secretary of State be requested to bring the matter to the attention of the proper authorities of the Dominion of Canada with a view to such action as will secure the maintenance of this minimum level at the Keewatin Dam.

This letter was referred to the Secretary of State on May 1, 1905.

It further appears that in 1896 upon complaint of settlers upon the south shore of the Lake of the Woods the Department of the Interior sent out an inspector from the General Land Office to investigate the overflow caused by the dam up of the outlet to the Lake of the Woods in Ontario, Canada. This inspector, Col. Naff, made a careful investigation and an exhaustive report saying that the stage of water in the lake had actually been raised at that time about 4 feet by means of dams across the outlet of the Lake of the Woods near Rat Portage, Ontario. This report was referred by the Interior Department to the War Department and by the War Department to the State Department May 20, 1896, and is now on file in your department. I am informed that since that report the dam has been raised so as to raise the level of the Lake of the Woods more than 7 feet.

The south shore of the Lake of the Woods is low and has a large number of small sluggish streams emptying into it which afford drainage to adjacent lands. These lands were ceded by the Chippewa Indians under the act of January 14, 1889, to the United States Government in trust and are subject to homestead on the payment of \$1.25 per acre. There are hundreds of settlers on these lands who claim that their lands have been overflowed and very greatly injured and damaged by the raise of the level of the water in the Lake of the Woods, and the remaining lands unsettled have been rendered worthless which has caused a corresponding damage to the Indians who are entitled to the proceeds of the sale of the land.

It appears therefore that the project referred to in the letter of the Chief of Engineers of April 26, 1905, is inconsistent with the interests of these settlers.

I have the honor to request information from your department whether or not any agreement or arrangement has been entered into with the Canadian authori-



ties regarding the subject of raising the level of the water in the Lake of the Woods, and if so, what the arrangement is, and whether this Government has requested or consented to the establishment of these dams in the rivers affording an outlet to the said lake. If this Government has made such an arrangement and consented to the establishment of these dams the Indians and settlers would have a just claim for recompense against this Government and if not they might perhaps have a claim against the Canadian Government for directly causing injury to their property.

This information is necessary to enable me to make suitable provision by legislation looking to the relief of these people.

Very respectfully,

H. STEENERSON.

Mr. TAYLOR. Mr. Chairman, when we were discussing the question of the reservations around the islands Mr. Deacon was not here. He is present now. He made the survey of very many of those islands and prepared the descriptions of them himself. He can testify on that point if you care to hear him.

Mr. MAGRATH. If it will take only a few moments, let him go ahead.

### TESTIMONY OF MR. THOMAS R. DEACON, OF WINNIPEG, CANADA.

THOMAS R. DEACON, who had been previously sworn, continued his testimony as follows:

Mr. TAYLOR. Mr. Deacon, I wish you would explain to the commission what you know about the reservations around the islands in the Lake of the Woods.

Mr. DEACON. When I practiced there there was a reservation of one chain inland from high-water mark on islands of 30 acres in area or over, that is if the gross area was 30 acres or over, the reservation was one chain from high-water mark inland. That reservation was described in departmental regulations of the Ontario Government as for purposes of fishermen to land to dry their nets and for mariners and lumbermen to tie boats and logs to. A title could be obtained to it, but the owner of the island had priority of application, whether he made the application or not. It was described as a road allowance, but it was not to be made into a road. The owner's consent had to be obtained by any other person who wanted to get a title to the lands or the minerals in the lands for that chain, or if they wanted to take up what was called a water location, that is, the land under the water, they had to get the consent of the owner of the land.

Mr. LAIRD. In the description of the patent from the Crown do you think the words "road allowance" were used?

Mr. DEACON. I think they were used.

Mr. TAYLOR. We will put in one of the patent forms.

Mr. ROCKWOOD. Was that road allowance excepted?

Mr. DEACON. Yes.

Mr. POWELL. Is there any provision in the patent that the grantee shall have the use of the land?

Mr. DEACON. The practice was that he should have the use of it.

Mr. POWELL. There is no provision in the Government patent as a grant?

Mr. DEACON. No. But I made many surveys for water location and also assisted in taking out many patents for road allowance, and in

every case the owner had priority and that was the ruling of the department.

Mr. KEEFER. He had priority of rights by the ruling of the department?

Mr. DEACON. In cases that I had the department always refused to grant the title, even to a water location entirely under water, without the consent of the owner of the land. They gave them an opportunity first.

Mr. MAGRATH. Is there anything further, gentlemen?

Mr. WYVELL. Mr. Chairman, Mr. Stewart informs me that there may be another letter which would complete the correspondence I spoke of. With the reservation that I may be allowed to introduce evidence to complete that correspondence, I have nothing further.

Mr. TAWNEY. Mr. Chairman, if there is nothing further, I offer the following resolution:

*Resolved*, That the International Joint Commission hereby extends to the city of Winnipeg and to its mayor and city council its sincere thanks and appreciation for their generosity, especially in granting to the commission the use of the council chamber in the City Hall for the conduct of its official business in hearing the people of the United States and Canada on the development and use of the waters of the Lake of the Woods, or the waters flowing into and from said lake, for power purposes; and that the secretaries of the commission are hereby instructed to transmit copies of this resolution to the mayor and council of the aforesaid city of Winnipeg.

Mr. MIGNAULT. I have great pleasure in seconding Mr. Tawney's resolution, and I wish to add that through the kindness and courtesy of our Winnipeg friends the proceedings of this commission have attained a very high level indeed.

Mr. MAGRATH. I think I see his worship the mayor present here, and it is with very great pleasure that I declare this motion unanimously carried and say to you, Mr. Mayor, that we are very grateful to you, indeed, because we know that we have put you to some inconvenience here inasmuch as we have been using your room when you required it for your own purposes. I therefore have great pleasure in tendering you the motion that has just been passed.

Mayor WAUGH. Gentlemen, I assure you that I did not come up here this morning from my office to address the commission. I can assure you that we are delighted to have you here, not only as visitors, but as commissioners taking part in this matter which is of so much importance to us all in the city of Winnipeg. We especially are glad to see the gentlemen from the United States. I think the fact that we have the two flags side by side up there above you indicates that we appreciate the fact that in this commission at least we are one and are trying to attain an object which will no doubt be most gratifying to the people of this section when we get it settled—if we do get it settled during the lifetime of those who are present.

I will convey your kindly resolution to the members of the city council, and I have no doubt it will be formally acknowledged in a way which I am sure the council of the city of Winnipeg would like to do it. You are always welcome to come here, and you will always find this council chamber here for the sittings you may have. We will gladly give up the council chamber for your convenience and take up our places in the back part of the city hall.

Mr. MAGRATH. Gentlemen, the hearings are over.

(Thereupon, at 12.40 o'clock p. m., the commission adjourned.)



## APPENDIX A.

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[House Document No. 92, Fifty-sixth Congress, second session.]

### EXAMINATION OF WARROAD HARBOR AND WARROAD RIVER, MINN.

[Letter from the Secretary of War, transmitting, with a letter from the Chief of Engineers, report of examination of Warroad Harbor and Warroad River, Minn.]

WAR DEPARTMENT,  
*Washington, December 3, 1900.*

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, United States Army, dated November 24 ultimo, together with report of Maj. Frederic V. Abbot, Corps of Engineers, dated June 21, 1900, of a preliminary examination of Warroad Harbor and Warroad River, Minn., authorized by the emergency river and harbor act of June 6, 1900.

Very respectfully,

ELIHU ROOT,  
*Secretary of War.*

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

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OFFICE OF THE CHIEF OF ENGINEERS,  
UNITED STATES ARMY,  
*Washington, November 24, 1900.*

SIR: The emergency river and harbor act approved June 6, 1900, made provision for preliminary examination and survey of Warroad Harbor and Warroad River, Minn. A survey of the locality having recently been made in connection with improvement previously authorized by Congress, the necessary data were already available, and I now have the honor to submit, for transmission to Congress, the accompanying report on the subject, dated June 21, 1900, with map, by the local officer in charge, Maj. Frederic V. Abbot, Corps of Engineers.

The town of Warroad is situated on the northern frontier in a region that has recently been opened for settlement. Its location is at the mouth of the Warroad River, in Lake of the Woods. A United States customhouse has been located there, a railroad has been completed from this point to Winnipeg, Manitoba, and a line running from Warroad toward the Red River Valley is projected.

In view of the considerations given in his report, Maj. Abbot expresses the opinion, which is concurred in by the division engineer, Col. J. W. Barlow, Corps of Engineers, that this locality is worthy of improvement by the United States to the extent specified, which, it is estimated, will cost \$45,000. This amount would provide a suitable dredging plant and operating expenses for two years.

Very respectfully, your obedient servant,

JOHN M. WILSON,  
*Brig. Gen., Chief of Engineers, United States Army.*

Hon. ELIHU ROOT,  
*Secretary of War.*

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### PRELIMINARY EXAMINATION OF WARROAD HARBOR AND WARROAD RIVER, MINN.

UNITED STATES ENGINEER OFFICE,  
*St. Paul, Minn., June 21, 1900.*

GENERAL: As directed by your letter of June 13, 1900, I have the honor to submit the following report on a preliminary examination of Warroad Harbor and Warroad River.

Warroad River is for a short distance a navigable tributary of the Lake of the Woods from the American side. At its mouth is situated the hamlet of Warroad. The accompanying map shows the shape of the harbor entrance and its depth. The appended report of Mr. C. W. Raynor, who made this survey under my direction, gives the necessary information with regard to the lake levels, the depths, and the character of material, so that an accurate estimate of the cost can be submitted. The commerce of the lake is very considerable, being carried in some eight steamers, some of them drawing as much as 7 feet of water, loaded. The entire Canadian shore is said to be reasonably well settled and with a number of points at which boats can land in safety. The Rainy River, connecting the Lake of the Woods with Rainy Lake, is navigable up as far as Koochiching, and a very considerable commerce is developed on this river in connection with the transportation of exports from the United States to Winnipeg. A shorter route to Winnipeg is provided by a new railroad just completed from Winnipeg to Warroad, provided the boats are able to enter this harbor, the only practical harbor on the American side.

On the American side of the lake the country is as yet a wilderness, consisting almost entirely of Indian reservation, portions of which only have been thrown open to settlement. Warroad is one of these localities thus opened. A railroad running from Warroad toward the Red River Valley is projected. If this is built, Warroad will become quite a distributing point. There is already a customhouse there, and some 600 tons of merchandise passed through the customhouse last year. Considering that this is the only American harbor on the lake, and that the lake and river form part of the international boundary, it seems not improper for the Government to provide suitable harbor facilities, if they can be secured for a reasonable sum.

An examination of the map shows the line of dredging required to give entrance to Warroad Harbor from the lake for the largest boats navigating the Lake of the Woods. To secure this channel will require the removal of about 150,000 cubic yards of material, estimated in barges, allowing about 40 per cent for expansion over the measurement in situ. The material is not difficult to excavate with an ordinary dredge. There is in the river itself a safe harbor for such a dredge in case of storms on the lake.

It has been difficult to determine the stability of the existing channels, the opinions of the local pilots being exceedingly contradictory, and the survey of Mr. Raynor being the first really reliable information that was obtainable. It is presumed, however, that, like most of the river entrances to lakes of this class, the channel is shifting, so that dredging will be but a temporary expedient. It would be undoubtedly necessary to keep a dredge in commission at this point. Such a dredge, barges and tender, could be constructed for between \$20,000 and \$25,000, depending on the price secured for lumber of suitable sizes in this out-of-the-way locality. The machinery of suitable size and power is already on hand in the district and not in use, being stored at Pokegama Falls dam. To run such a machine and to keep it in proper repair would cost \$10,000 a year. The machine would have sufficient power to give a useful channel of less than the full projected width for the first year.

The estimate of cost would then be as follows:

The original construction of the dredge and barges and tender at Warroad Harbor.....	\$25,000
Cost of running the same for one year.....	10,000
Total original appropriation required.....	35,000
Annual cost of maintenance thereafter.....	10,000

In consideration of the facts heretofore stated in this report, I believe the locality to be worth the expenditure of at least \$45,000 under the project outlined above, as by that time the utility or uselessness of maintaining a navigable entrance to Warroad River will have been demonstrated by the rapid growth of Warroad into a place of importance or by its continuance in its present embryonic state.

Very respectfully, your obedient servant,

FREDERIC V. ABBOT,  
Major, Corps of Engineers.

Brig. Gen. JOHN M. WILSON,  
Chief of Engineers, U. S. A.  
(Through the Division Engineer.)



[First indorsement.]

U. S. ENGINEER OFFICE, NORTHWEST DIVISION,  
New York, June 30, 1900.

Respectfully forwarded to the Chief of Engineers, United States Army, concurring in the views of the district engineer that this locality is worth improving by the United States to the extent of \$45,000.

J. W. BARLOW,  
Colonel, Corps of Engineers,  
Division Engineer.

[Second indorsement.]

OFFICE CHIEF OF ENGINEERS, U. S. ARMY,  
October 30, 1900.

Respectfully submitted to the Secretary of War.

The emergency river and harbor act approved June 6, 1900, provided for a preliminary examination of Warroad Harbor and Warroad River, Minn., and under certain favorable conditions a survey was to be made upon authority of the Secretary of War, at his discretion, and plan and estimate of cost was to be prepared.

Under a misapprehension of the law, the local officer included in the within report of the preliminary examination a plan and estimate of cost of improvement of Warroad Harbor and Warroad River, and I recommend that his action in combining in one report the substance of the two contemplated by the act be approved.

JOHN M. WILSON,  
Brig. Gen., Chief of Engineers, U. S. Army.

[Third indorsement.]

WAR DEPARTMENT, November 2, 1900.

The recommendation of the Chief of Engineers is approved.

By order of the Secretary of War:

JOHN C. SCOFIELD, Chief Clerk.

#### REPORT OF MR. C. W. RAYNOR, TRANSITMAN.

ST. PAUL, MINN., February 5, 1900.

MAJOR: Under your written order, dated December 11, 1899, I have the honor to submit the following:

Leaving St. Paul on the night of December 11, 1899, I reached Warroad, Minn., December 15, 1899. Here I found good accommodations with the deputy collector of customs and proceeded to organize a party, which varied in number from two to seven men, to carry on the survey.

I reran the section lines of sec. 28, T. 163 N., R. 36 W., fifth principal meridian, set triangulation stations, using the base and principal triangle laid out by Mr. T. Milton Fowble the previous May for my survey and tying his survey, the section corners, and meander corners together.

A base line for soundings was run from M. C. 27-28 to M. C. 21-28, measuring 4,382 feet on the ice. I laid off 200-foot stations from M. C. 27-28 toward M. C. 21-28, designating each station by the roman numerals, I to XX. At each station thus laid off lines at right angles with the base were laid out, and at each station a line perpendicular to the base was marked on the ice by holes 200 feet apart. At each hole a sounding was made with a pole, the nature of the bottom, as indicated by the feeling of the pole, being recorded, as well as the depth in feet and tenths. These lines of soundings were extended to the shore on one side of the base and out into the lake for a distance of 3,000 feet on the other side of the base. In an easterly direction from the base soundings were then taken at the intersections of the diagonals of the 200-foot squares made by the first set of sounding holes until 7 feet of water was found. In a westerly direction the same was continued to the shore. At the sand bar found across the channel, soundings were taken every 50 feet, showing a depth of 5 feet, more or less, at a lake level corresponding to a gauge reading of 7.20 (elevation 1,007.20), to which lake level all soundings were reduced.

The zero of the gauge was placed at an elevation of 1,000, transferred from bench mark established in May by T. Milton Fowble, which he called 1,014 feet above an assumed datum plane. During the past season daily gauge readings

were taken, June 1 to December 4, showing a minimum stage of water on June 7, 1899, lake level 1,006.70 feet, and a maximum on July 19, when the surface of the lake stood at an elevation of 1,008.71, referred to the above assumed datum plane.

The elevation of the water in the lake is, to a considerable degree, controlled by the Keewaten Power Company, at Rat Portage. This dam, according to T. Milton Fowble, who made a hasty examination of the mouth of Warroad River and made inquiries in regard to the dam and its effect upon the stage of water in the lake, was built two years ago for water power purposes, but is not in use at present, and is under the control of the government of Ontario, and will remain so until the power is leased or sold.

I quote the following from Mr. Fowble in regard to the dam:

"This is a masonry dam constructed across the Winnipeg River in Canada, which is the outlet of the Lake of the Woods, at a point about 1 mile below the lake.

"At the time of my visit, May 25, to the dam, there were strong rapids in the river between the dam and the lake. Mr. McQuarrie, the dam tender, whose post-office address in Norman, Ontario, informed me that the surface of the river at that time, immediately above the dam, was 6.60 feet lower than the surface of the lake. The river at the dam has been 6 feet higher than at present, 6 feet of stop logs being recently removed.

"Mr. McQuarrie said that the company does not consider it safe to attempt to hold the water at the dam any higher than 6 feet above the present stage at the dam, although the top of the dam is about 11 feet above the present river surface."

On the date, May 25, given by Mr. Fowble, the gauge at Warroad registered between 7 and 7.20, as near as I can ascertain.

In a letter to Mr. Fowble, dated July 15, 1899, from Mr. A. McQuarrie, the watchman at the dam, I find the following: "I commenced to look after the gauges on the 19th of November, 1898. The lowest since then was in April last, between the 19th and 22d, when it registered 99.50, and the highest at present, when it registered 102.10. We call the normal level of the lake 100. The lake has differed 10 feet between low and high water mark. It has been considerably higher than at present. This fact came out as testimony in a suit at law, *Ross v. the C. P. R. Ry.*"

On the 14th of July the gauge at Warroad registered 8.41 feet or a lake level of 1,008.41. This, according to Mr. McQuarrie, is 2.10 feet above the normal, thus giving the lake elevation at Warroad of 1,006.31, or a gauge reading of 6.31 as normal. This stage of the water is 0.90 foot lower than the stage to which my soundings were reduced, thus giving but a little more than 4 feet of water over the bar at the mouth, but this is undoubtedly affected by the winds.

The last season was reported to be a very rainy one, and this no doubt has had something to do with the elevation of the water in the lake, notwithstanding the action of the dam.

Having finished the soundings in the lake, I proceeded in the same manner up the mouth of the river, using as a base the westerly prolongation of a line through Station V and commencing at a point known as A, 1,200 feet from V, and proceeding along said line in a westerly direction by 200-foot stations, designated consecutively from A to R, where base turns at right angles in a northerly direction, and in 200-foot stations continuous to W + 168, where it intersects left bank of Warroad River in front of Jones & Lawson's store.

Where sounding lines crossed the channel, soundings were taken every 25 feet to get the exact location, width, and depth. Soundings were also taken every 25 feet along sounding lines on the left side of the river to obtain the necessary data for straightening the channel. I found the channel very winding and narrow, but over 10 feet deep (1,800 soundings were taken).

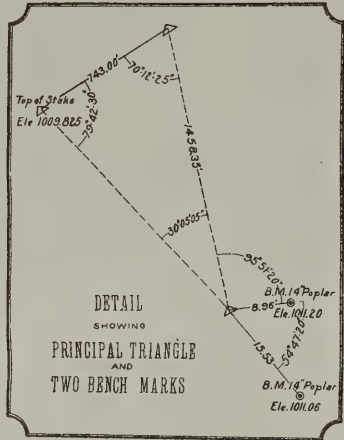
United States engineer bench mark No. 303 was set near the custom-house (with an elevation of 1,012.35 cap; 1,008.45 copper bolt, transferred from Mr. Fowble's bench mark established in May with an assumed elevation of 1,014.00).<sup>1</sup>

<sup>1</sup> The bench marks set by parties in the field from this office are shown on the attached sketch. In setting them the stone is buried 3 to 4 feet in the ground, with the face having the copper bolt up. Upon this, and having its center directly over the copper bolt, the wrought-iron pipe is placed in a vertical position and held while the earth is thrown in and tamped around the whole.

In recording the elevation of the bench mark in the field books a reading on the copper bolt is obtained by removing the cap and placing the rod down the pipe until it rests upon the copper bolt. This is the permanent bench mark. The elevation of the cap is recorded also and used as a temporary bench mark, as it saves the time required to remove and replace the cap whenever a reading upon the bench mark is desired.



20 21  
29 28



SECTION 28  
TOWNSHIP 163 N  
RANGE 36 W

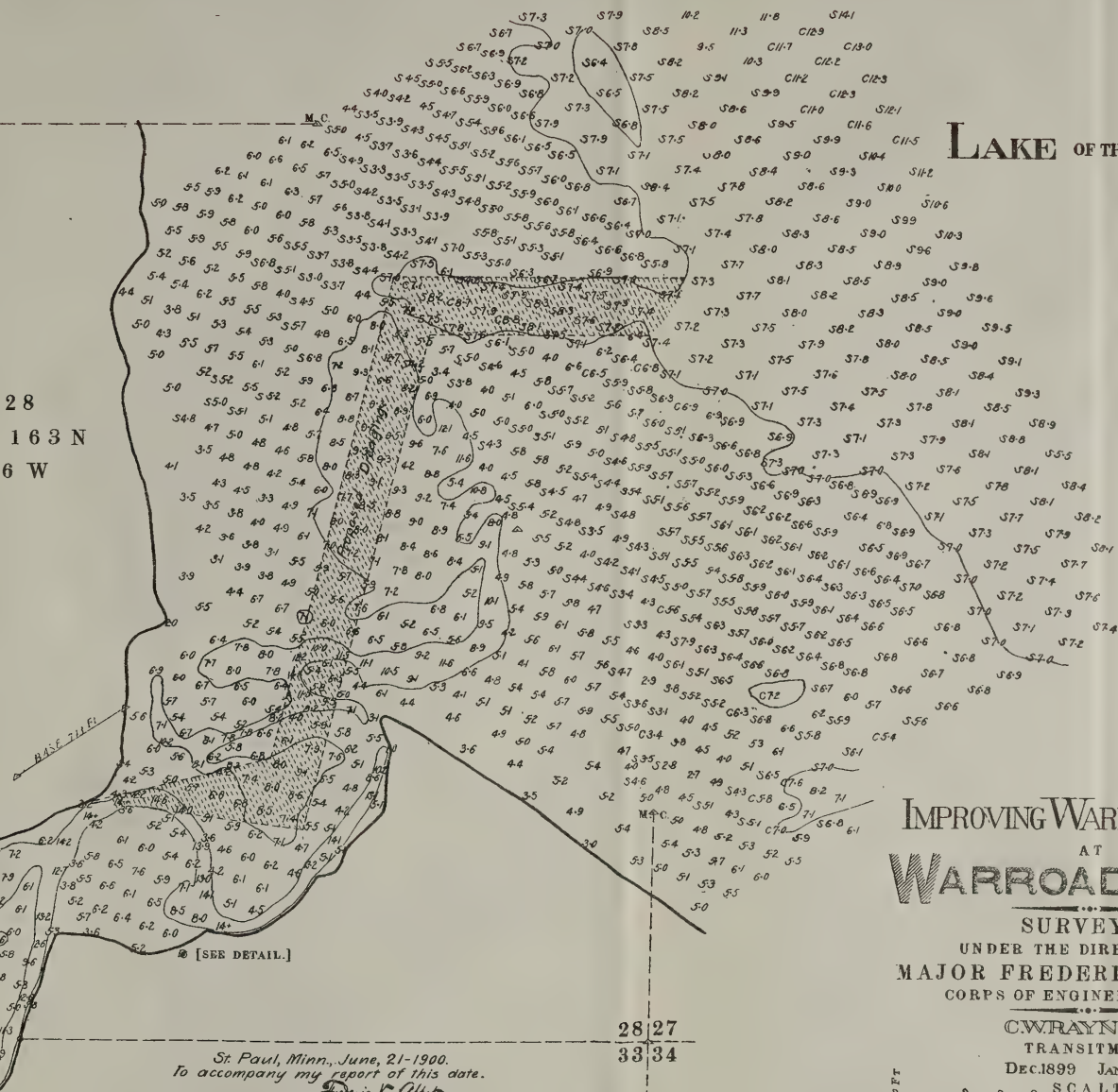
NOTE

Survey made for 7 ft. channel  
All soundings reduced to lake  
level corresponding with gauge  
reading 7.00.  
Elev. 0.0 on gauge 1000.00 re-  
ferred to assumed datum de-  
termined by permanent bench  
marks.  
MC. 27-28 to MC. 21-28 mea-  
sured on ice 4382 ft. used as  
base for laying out soundings.  
Channel bottom, river gravel and sand,  
covered to varying depths with a  
muddy deposit which disappears  
during spring high water.  
USE B.M. 303 elev. 1008.45;  
cap. 1012.35, transferred from  
T.M. Fowles' B.M. elev. 1014.00 as-  
sumed.  
See note books J11 & J12.

WARROAD RIVER

7 ft. contour indicated thus —  
S indicates sand or river gravel  
forming a firm bottom  
C indicates a sticky clay  
SOUNDINGS UNINDICATED HAVE MUD  
DY BOTTOM.

29 28  
32 53



St. Paul, Minn., June, 21-1900.  
To accompany my report of this date.  
Frederic V. Abbot  
Major Corps of Engineers U.S.A.

LAKE OF THE WOODS

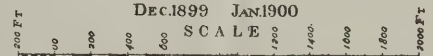
IMPROVING WARROAD RIVER  
AT  
WARROAD MINN.

SURVEYED  
UNDER THE DIRECTION OF  
MAJOR FREDERIC V. ABBOT  
CORPS OF ENGINEERS U.S. ARMY.

C. W. RAYNOR  
TRANSITMAN.

Dec. 1899 JAN. 1900

SCALE







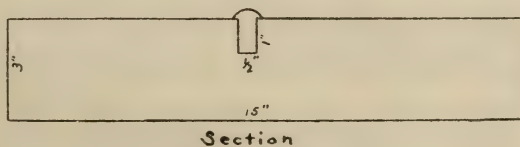
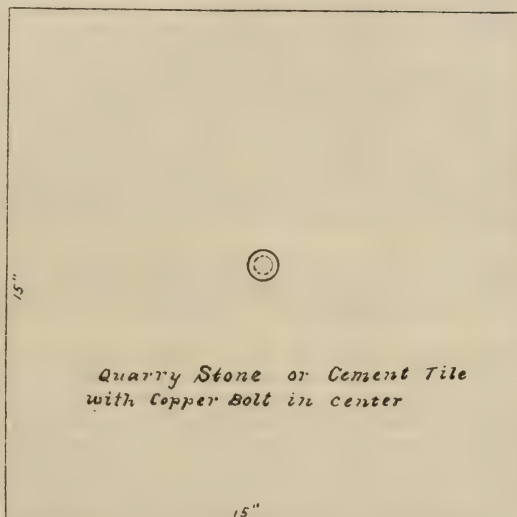
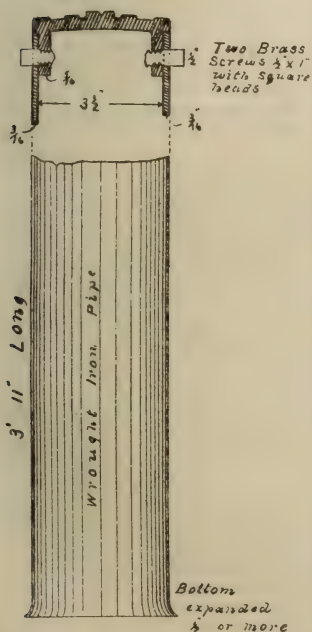
# DESIGN FOR BENCH MARK



Top of cap will be slightly oval and the central square will be raised about  $\frac{1}{8}$ " above the lettering

Cast Iron Cap

$\frac{3}{8}$ " thick



Note:-

300 cast iron caps to be numbered consecutively from 101 to 400

The Copper Bolt is to be leaded in the stone

To accompany Report.  
Preliminary Examination of Warroad Harbor, Minn.

H Doc 92 56 2





A line of levels was run to two bench marks established on the right bank of river and near the mouth, used also as reference points to Mr. Fowble's triangulation station No. 3.

Two water levels were taken, one on each side of the river and on a line joining Mr. Fowble's stations No. 3 and No. 2. An elevation was also recorded of the tops of triangulation station No. 2 and of a nail in top of M. C., section 28-29, on left bank of the river.

Ninety-nine days' labor in the field was recorded on the pay rolls, of which six were spent in traveling.

The weather was favorable. The ice, nearly free from snow, varied in thickness from 12 inches at first to 36 inches at the last. All holes in the ice were cut with an ax, the only implement to be had for the purpose.

Warroad itself consists of a few temporary buildings, occupied by two saloons, a barber shop, a restaurant, a general store, and a hotel. The land has been lately opened for settlement, which, under the "homestead law," must be occupied 5 years before a deed can be obtained. A bill, however, has been placed before Congress to allow C. A. Moody and Albert Berg to commute their claims, which, if passed, will allow a town site to be laid out in the spring.

The Manitoba and Southeastern Railway, now under construction from Winnipeg to Port Arthur, has steel laid from Winnipeg to the north bank of Warroad River, and the grade is under construction from the south bank east. Warroad River has been made a division headquarters. This road will open up for settlement that region known as the Rainy Lake district. A surveying party, if not already in the field, will soon commence the location of a railroad from Stephen or Crookston, connecting with the Manitoba and Southeastern at Warroad, thus giving a direct outlet for the wheat of the Red River Valley billed to eastern markets.

Rat Portage, on the northern shore of the Lake of the Woods, has heretofore controlled the bulk of the commerce on the lake and Rainy River, supplying the region from Winnipeg. (Rainy River is reported to be navigable up to the vicinity of Fort St. Francis.)

Warroad River affords the only natural harbor on the American side of the lake and, if opened to a navigable depth, would transfer the bulk of this commerce to Warroad, which is 12 miles nearer Winnipeg and in a direct line with the Rainy Lake region. During the past year 600 tons of freight passed through the customhouse, which, by the building of the Manitoba and Southeastern Railway, becomes the only customhouse of the first class in the State of Minnesota.

At present the river channel, though giving a depth of over 10 feet, is very narrow and winding, and at the mouth is crossed by a sand bar covered by only 5 feet, more or less, of water making it impassable at the ordinary stages for the larger boats. The channel and entrance is unmarked by lights and can not be entered at night. The wind affects the depth of the water in the river, making a variation at times, it is reported, as high as 18 inches.

The people of this region are unanimously desirous of having the necessary work done to make Warroad River accessible to all boats plying on the Lake of the Woods, of which there are over 100 engaged in commerce and pleasure, and of which the maximum draft is 8 feet.

Warroad, with a navigable harbor and the railroads, has, by its location, every prospect of becoming a place of several thousand inhabitants and of carrying on much of the trade which at present falls to the Canadians.

Returning from Warroad, via Winnipeg, and arriving in St. Paul January 14, 1900, I prepared a map, submitted herewith, together with notebooks J. I. 1 and J. I. 2.

Having carried out your orders for the benefit of the public service, to the best of my knowledge, I respectfully submit this report.

C. W. RAYNOR, *Transitman*

Maj. FREDERIC V. ABBOT, *Corps of Engineers, United States of America.*

UNITED STATES ENGINEER OFFICE,

St. Paul, Minn., Apr. —, 1906.

Brig. Gen. A. MACKENZIE,

*Chief of Engineers, U. S. Army, Washington, D. C.*

GENERAL: I have the honor to acknowledge the receipt of your letter of March 22, 1906, in relation to the level of the Lake of the Woods, requesting information as to why I selected the level of 7.2 feet as the proper one to be

maintained and what damages if any may be expected to result from so maintaining the level.

2. My reasons for selecting the level of 7.2 feet are as follows:

I. When a dam exists at the outlet of a navigable lake undergoing improvement by dredging for the benefit of navigation, it would seem to be expedient to utilize the dam to help the improvement by preventing the level of the lake from falling as low as the natural low water stage.

II. In the interest of navigation the standard low water stage below which the level of the lake should not be permitted to fall, should manifestly be the highest stage which would not invade the rights of interests other than navigation.

III. On the Lake of the Woods I know of but two other interests concerned besides navigation, the water power companies at the outlets and the riparian owners on the shores of the lake. The water power companies would like the minimum level of the lake held as high as possible consistently with leaving sufficient storage space in the lake between that minimum level and the highest level authorized. As the area of the Lake of the Woods is upward of 2,000 square miles and high water mark is 8.9 feet or more and the mean high water for the four years for which records exist is 8.22 feet, the standard low water stage of 7.2 feet would seem to meet the requirements of the water power interests very well. The riparian owners on the shores of the lake would like the lake drained dry, as the title to its bed would then revert to them and the land could be sold for agricultural purposes. But while this would doubtless be their preference, their rights are much more limited and are quite clearly stated, I think, in certain cases that have been tried before the Supreme Court of the State of Minnesota and before the courts of the United States. From these cases, to some of which I refer more specifically below, I judge the level of 7.2 feet to be such as could be maintained in the Lake of the Woods without invasion of the rights of riparian owners.

IV. When the original survey of Warroad Harbor was made under the direction of Maj. Abbot in 1899-1900, 7.2 on the Warroad gauge was taken as the datum to which all the soundings of the survey were reduced, and this datum was subsequently used as the datum plane of the project for improvement. I have had all the original notes, sketches, and reports carefully searched but can find no record of the reason that governed the district officer or his assistant in the choice of this particular plane of reference. The survey lasted from May 17, 1899, to January 12, 1900. During that period the lowest gauge reading recorded was 6.3, the highest was 8.71, and the mean was 7.68.

V. The elevation of 7.2 feet is not far from mean lake level as deduced from all the gauge readings that have been taken since the gauge was first established at Warroad in 1899, including the winter months when the lake is frozen over, this mean being 6.62.

VI. It is quite closely the mean lake level during the season of navigation, 7.24, as shown by the following table giving the monthly mean of the daily readings during the four seasons that the gauge has been recorded. The lowest records for the same years are: 1899, 6.3; 1903, 6.11; 1904, 5.0; 1905, 4.7, respectively.

Year.	June.	July.	August.	September.	October.	Mean.
1899.....	7.60	8.40	8.32	7.58	6.97	7.77
1903.....	7.63	7.15	6.77	6.46	6.28	6.85
1904.....	6.54	6.91	6.83	6.40	5.99	6.53
1905.....	6.50	7.91	8.44	8.32	7.80	7.79
Means.....	7.07	7.59	7.59	7.19	6.76	7.24

3. As regards the inquiry as to what damages, if any, may be expected to result from maintaining the level of the lake at 7.2 feet on the Warroad gauge, my opinion is that there would be none, and my reasons for so thinking are as follows.

In the case of *Lamprey v. Minnesota* (52 Minn., 181), the supreme court of the State establishes the principle that the law governing riparian rights on navigable lakes in Minnesota is the same as on navigable streams.



In the case of *Gniadck v. Northwestern Improvement & Broom Co.* (73 Minn., 87), it is held: "The defendant corporation was authorized by its articles to use these waters for a public purpose, and it therefore had the rights of the public in the stream and within its well-defined banks. In aid of navigation it could raise and permanently maintain the water up to ordinary high-water mark without making any compensation to riparian owners and without incurring liability in case of injury to them.

"While the title of a riparian owner in navigable or public waters extends to ordinary low-water mark, his title is not absolute except to ordinary high-water mark. As to the intervening space the title is limited or qualified by the public right. The State may use this space for the purpose of navigation, and within the well-defined banks and below ordinary high-water mark the public right is supreme."

In *Fulmer v. Williams* (15 Atlantic Reporter, 726) the supreme court of Pennsylvania holds: "A grant of land bounded upon a navigable river extends to ordinary low-water mark only. Between this line and high-water mark the land of the grantee is, by the nature and necessities of the situation, subject to a servitude in favor of the public."

In *Mills v. United States* (46 Fed. Rep., 738), in a court of the United States, the same doctrine is propounded, it being held (p. 747) that "the plaintiffs have no legal claim against the Government for the diversion of those waters from their rice fields, or for an increase in the flow of the tide which will fill the canals and ditches they have constructed on the level between low and high water mark, a level which is subservient to the Government for the purposes of navigation"; and in the State of Georgia, where the above case arose, "the low-water line is the boundary of littoral proprietors on the tide waters."

4. In the cursory examination I have been able to make I have not found decisions of the Supreme Court of the United States specifically affirming the right of the United States, in aid of navigation, "to raise and permanently maintain" the level of navigable waters of the United States "to ordinary high-water mark without making any compensation to riparian owners and without incurring liability in case of injury to them," but I have found much that is consistent with that doctrine and nothing that is inconsonant. I have no doubt that such is in fact the law of the land.

5. In the case under consideration there remains then only what uncertainty there may be as to whether the level of 7.2 on the Warroad gauge is actually lower than "ordinary high water." As already stated, the gauge at Warroad was not established until 1899, and since then record of it has only been kept for four seasons, during which high water was 8.71 in 1899, 8.06 in 1903, 7.2 in 1904, and 8.9 in 1905, and the mean was 8.22. It is not impossible, though I do not think it probable, that the Keewatin Dam was so manipulated during these four years as to affect the high-water stage. On the two occasions when the dam was inspected by agents of the United States Engineer Department the slope in the mile of river between the dam and the lake was reported as 3 feet and 6 feet, respectively, and we know that during the four years mentioned the lake was allowed to fall to a low-water reading of 6.3 in 1899, 6.11 in 1903, 5 in 1904, and 4.7 in 1905. The Keewatin Dam was built in 1898 for water-power purposes, but has never been used for that purpose as yet. I believe that the above figure, 8.22, is very near the present ordinary high-water mark. The Minnetonka Lake Improvement case, referred to above, is instructive on this point, the court defining with much precision the legal meaning of ordinary high-water mark. It is there stated (p. 522) "high-water mark, as a line between a riparian owner and the public, is to be determined by examining the bed and banks and ascertaining where the presence and action of the water are so common and usual and so long continued in all ordinary years as to mark upon the soil of the bed a character distinct from that of the banks, in respect to vegetation as well as respects the nature of the soil itself." My assistant, Mr. Horace Dunaway, surveyor, who made the last resurvey of Warroad Harbor in December, 1905, reports that at the time of the survey the gauge read 8.1, and that the line between the aquatic vegetation of the lake (bul-rushes) and the terrestrial vegetation of the banks was still several inches above the water level. It would therefore appear that the level 7.2 is well below ordinary high-water mark as it exists to-day.

6. Finally, if there remains any doubt as to whether the Canadians since the construction of the Keewatin Dam in 1898 or prior to its construction,

when it is reported that there was once an old dam at the outlet of the lake that was afterwards removed, may have so obstructed the outlet of the lake as to permanently change ordinary high water mark. I would respectfully suggest as a means of avoiding the difficulty that the object of my recommendation in my report of April 17, 1905, would be secured if the Canadian authorities would agree to have the Keewatin Dam so manipulated as to maintain the low-water stage of the Lake of the Woods at a level not more than one foot lower than ordinary high-water mark. As a precaution against aggravating high-water conditions all of the stop-plank should be removed from the dam by the time the stage of the lake has risen as much as half a foot above the standard low-water stage.

7. In any event it is probable that parties interested in lands on the shores of the Lake of the Woods, with the attendant possibilities of securing a portion of the bed of the lake as accretions or relictions, will not be satisfied until the level of ordinary high water has been authoritatively determined and the rights of the public in its navigation have been asserted and maintained. A great many of the lakes of Minnesota have dried up and disappeared entirely of recent years, and there are many people in the State who are interested in assisting nature in this direction.

Very respectfully, your obedient servant,

G. McC. DERBY,  
*Major, Corps of Engineers, U. S. Army.*

[2d indorsement.]

WAR DEPARTMENT,  
OFFICE OF THE CHIEF OF ENGINEERS,  
*Washington, February 6, 1908.*

Respectfully referred to Maj. F. R. Shunk, Corps of Engineers, for report, giving the information requested by the Department of State as far as may be practicable.

By command of Brig. Gen. Mackenzie.

J. B. CAVANAUGH,  
*Captain, Corps of Engineers.*

[3d indorsement.]

UNITED STATES ENGINEER OFFICE,  
*St. Paul, Minn., February 15, 1908.*

1. Respectfully returned to the Chief of Engineers.

2. Before work has begun at Warroad, a gauge with arbitrarily assumed zero was set in the lake at that place. The mean level of the lake during the open season was assumed to be 7.2 feet, and the depths to be dredged regulated accordingly. This level was assumed from the best information obtainable; it was not based upon actual measurements. Gaugings have been taken since that time and records are on file for the years 1899, 1903, 1904, 1905, 1906, and 1907. The mean level of the lake during the open seasons of these six years has been 7.15 feet, so that it appears that the assumed level was very nearly correct.

3. The lake is subject to considerable changes of level. High and low waters during the open seasons of the years above referred to were as follows:

	Low water.	High water.
1899-----	6.30	8.71
1903-----	6.19	8.06
1904-----	5.10	7.10
1905-----	4.70	9.00
1906-----	5.60	8.20
1907-----	5.10	8.90

There has been nothing unusual in the variations during the past year, and I am of opinion that they were due to natural causes and not to the operation of dams.

FRANCIS R. SHUNK,  
*Major, Corps of Engineers.*



UNITED STATES ENGINEER OFFICE,  
St. Paul, Minn., March 3, 1908.

Brig. Gen. A. MACKENZIE,  
Chief of Engineers, United States Army,  
Washington, D. C.

GENERAL: 1. I have the honor to acknowledge department letter of February 29, 1908, referring to level of Lake of the Woods.

2. Daily gauge readings were begun on May 1 and continued to October 31. Since that time the gauge has been read about once a month. The monthly means during the open season and monthly readings since that time are as follows: May, 1907, 5.42; June, 1907, 6.12; July, 1907, 6.43; August, 1907, 6.95; September, 1907, 7.85; October, 1907, 8.60. Gauge reading October 31, 1907, 8.60; November, 1907, none taken; December 20, 1907, 8.40; December 31, 1907, 8.40; January 31, 1908, 7.90; February 29, 1908, 7.80.

3. There are no records in this office which will give any information as to the level of the lake before construction of the Rat Portage dam. This dam was built in 1898. The gauge at Warroad was set in 1899, and there are no records before that time. When the gauge was set, the mean level of the lake during the open season was assumed to be 7.2 feet as stated in my letter of February 15, 1908. This information was based upon the best available local information, and subsequent observations have shown that it was very nearly correct and would indicate that the level of the lake has not been greatly changed.

Very respectfully, your obedient servant,

FRANCIS R. SHUNK,  
Major, Corps of Engineers.

[1st indorsement.]

WAR DEPARTMENT,  
OFFICE OF THE CHIEF OF ENGINEERS,  
Washington, D. C., January 5, 1911.

Respectfully referred to Maj. F. R. SHUNK,  
Corps of Engineers, for report.

By order of the Acting Chief of Engineers:

E. N. JOHNSON,  
Captain, Corps of Engineers

[2d indorsement.]

UNITED STATES ENGINEER OFFICE,  
St. Paul, Minn., January 11, 1911.

1. Respectfully returned to the Chief of Engineers.

2. All work at Warroad has been based upon an act of Congress approved June 13, 1902, which provided that work should be done in accordance with a report published in Document No. 92, Fifty-sixth Congress, second session. The report, in brief, recommends a channel for boats drawing 7 feet, but has been apparently interpreted by Congress, in the act of March 3, 1905, providing for an extension of the channel, as contemplating a depth of 7 feet, which is not the same thing. The usual provision "at mean low water" is not made, nor is any other stage of water mentioned. The officer in charge of the district reported on June 20, 1907, that the depths decided upon as necessary under the project were 9 feet at the inner end and 12 feet on the outer bar, at a stage of 7.2 on the Warroad gauge. These depths were presumably approved, and all subsequent work has been based upon that supposition. 7.2 on the Warroad gauge is mean lake level during the navigation season. Mean low water during navigation season is just about a foot lower than this, or 6.2. Mean lake level for the entire year is 6.6. The adopted depth therefore gives 9 feet at mean level during navigation season; 8 feet at mean low water during navigation season; and 7 feet at a stage 1 foot below low water during navigation season. It is my opinion that the allowance is ample and that dredging to greater depth would not be proper under the approved project.

2. A channel of the above described depth has been completed, but will require work of maintenance from time to time. A profile showing the soundings recently taken by citizens of Warroad is forwarded herewith. It shows (if the soundings are assumed to be correct) that the bottom of the dredged

channel is about where it ought to be. Such work of maintenance as will be required can easily be done before the navigation season opens, and there is plenty of money for this purpose.

3. The citizens of Warroad apparently think that the present low stage of water is to be permanent. Equal alarm was felt about a high stage in 1907, and complaints forwarded to the Secretary of State (E. D. 30371/52). As has been mentioned in sundry reports from this office, 1910 was by a large minority the driest year on record in Minnesota. The usual spring rains did not occur, and the lake has been falling since last winter. Toward the close of the season, when the *Knute Nelson* had her difficulties, the available depth was less than 6 feet. But I do not think that the project need be modified because of the events of one very exceptional year. It is reasonable to suppose that the normal lake level will be restored.

4. If the *Keenora* really requires 10 feet of water, she can not come to Warroad. But I know that she ran for some years between Rat Portage and points on Rainy River, and continued to run while the entrance to that river was not more than 6 feet deep at mean summer stage. Very recently a deep channel has been dredged by the Canadian Government, but until this was done (unless I am mistaken) there never was a greater depth than 8 feet at the entrance to Rainy River at mean summer stage. The *Keenora* will therefore find better depths at Warroad than she ever had at Rainy River until the new channel was dredged.

5. It is not my opinion that additional funds are required at Warroad.

FRANCIS R. SHUNK,  
*Major, Corps of Engineers.*

[First indorsement.]

WAR DEPARTMENT,  
OFFICE OF THE CHIEF OF ENGINEERS,  
*Washington, February 17, 1911.*

Respectfully referred to Maj. F. R. Shunk, Corps of Engineers, for remark.  
By command of the Chief of Engineers:

WM. JOHNSTON,  
*Captain, Corps of Engineers.*

[Second indorsement.]

UNITED STATES ENGINEER OFFICE,  
*St. Paul, Minn., March 18, 1911.*

1. Respectfully returned to the Chief of Engineers.

2. Mr. Brown is not very far wrong in stating that boats have had trouble at Warroad during every season. At least it is true that they have had trouble during most seasons. There is in the lake a substance called muskeg which drifts along the shores, and before the jetty was built the entrance to the dredged channel would fill in almost as fast as it was dredged out. I would respectfully refer to my report of December 23, 1908 (E. D. 30371/60). The jetty was not finished until 1909, and it happens that the season of 1910 had exceptionally low water.

3. It is not a fact that 7.2 level was derived from seasons when there was an exceptionally high stage of water. It was first assumed in the absence of records from the best information available, derived from marks and residents about the lake. At the end of 1906 observations of 5 years showed a mean level during navigation season of 7.2—almost exactly what had been assumed. Including the subsequent years the mean level during navigation seasons is 7 feet. As both exceptionally high and exceptionally low levels have occurred since 1899, when records begin, it is not likely that the ultimate mean level during navigation season will get beyond the limits 7 on one side and 7.2 on the other.

4. The highest level which has occurred in the Lake of the Woods since June, 1899, was 8.8 in October, 1907. The lowest level on record was 4.2 in December, 1910, making an extreme fluctuation, so far as our records go, of 4.6 feet. However, this lowest reading did not occur during the navigation season. The total fluctuation during navigation season was between 4.5 at the end of October, 1910, and 8.8 in October, 1907, a total fluctuation of 4.3 feet. The fluctuation during the year 1910 was 3.8 feet, between 8 for several days in



April and 4.2 for several days in December. The fluctuation during navigation season was exactly 3 feet, between 7.5 in June and 4.5 at the end of October. The mean low water during navigation season up to date is 6.1.

5. In view of these facts I am of the opinion that the mean level during navigation season might be corrected to 7 feet and mean low water during navigation season to 6.1 feet, and one or two-tenths more be given by dredging.

6. Nothing else in Mr. Brown's letter appears to call for remark.

FRANCIS R. SHUNK,  
Major, Corps of Engineers.

UNITED STATES ENGINEER OFFICE,  
St. Paul, Minn., June 9, 1911.

THE CHIEF OF ENGINEERS,  
United States Army, Washington, D. C.

SIR: 1. In compliance with first indorsement on E. D. 30371/83, I have the honor to submit the following report on the situation at Warroad Harbor. Earlier report has not been possible on account of absence from my station.

2. The level of the Lake of the Woods at the date of my last report (second indorsement on E. D. 30371/81, dated Mar. 16, 1911) was 4.2 feet. This was unusually low. Instead of recovering, the lake has fallen still lower and has been for the past two months about 3.25. This is the lowest level of which we have record, though old settlers mention a time some 16 years ago when there was an even lower stage of water. The fall of snow last winter was greater than usual and it was anticipated that there would be plenty of water in the lake this season, but the expected rise did not occur, as the snow passed off very gradually, mostly in the way of evaporation. The Rainy River, which is the chief source of supply of the Lake of the Woods, is very low and there does not seem to be a very good prospect for recovery of level this season. The available channel depth is now about 5 feet.

3. With respect to the depth and datum plane, it is my opinion that the language of the act of Congress adopting the project is not definite, and admits of different interpretations. The onus of making the decision developed upon the then district officer, whose interpretation was that the project provided for accommodation for the vessels of deepest draft then using the Lake of the Woods; that this depth was 7 feet and that ample accommodation would be provided by giving a depth of 7 feet at a stage of 1 foot below mean low water during navigation season. This interpretation has been acted upon from the beginning and has as I suppose received constructive approval from the Chief of Engineers, though specific approval has never been given. It is my opinion that the interpretation originally made was a just one, and my own view is that excavation to a greater depth can not properly be made under the existing project. The question as to whether greater depth is required for purposes of navigation is an entirely different one and, as I suppose, would involve a change of project and consequently a preliminary examination and report under suitable action by Congress.

4. If a channel is dredged, as desired by the citizens of Warroad, 8 feet deep at a stage of 3.3 feet on the Warroad gauge, this will involve a lowering of the bottom of the dredged channel 2.9 feet below its present level, speaking generally; in some places more and in others less. The total amount to be removed would be 210,000 yards and the total cost \$21,000. There is not money enough available to do this, and, as before stated, it is not my opinion that the work can properly be done under the project adopted by Congress.

4. I entertain the opinion that a navigable channel should be deep enough to provide accommodation for vessels at a stage which may be called ruling low water; that is to say, a low stage which occurs with sufficient frequency to warrant being provided for. Exactly how often such a stage should occur to justify its adoption as ruling low water might be a subject for controversy. The present low stage is very unusual. The Canadian Government in its dredged channel at the mouth of Rainy River has given a depth of 13 or 14 feet at a stage of 7.2 on the Warroad gauge. This is 4 or 5 feet deeper than the channel at Warroad and was adopted, I think, not so much to accommodate vessels of deeper draft as to provide ample depth, not at a ruling stage, but at the lowest possible stage of water. I do not understand that such is the policy of the United States.

6. It is not possible that the low stage of the lake should be due to operation of the International Falls Dam, which does not interfere with the normal flow of the Rainy River. With respect to the Canadian dam at Kenora (Rat Portage), I am unable to obtain conclusive information. This dam was examined by Mr. George W. Freeman, assistant engineer, two years ago. Mr. Freeman reported that the stream through which the lake discharged falls rapidly just beyond the outlet, and that the dam is situated from 20 to 30 feet below the lake level. This difference of level was merely estimated and may be wrong. Another witness, Mr. Marschall, states that there is slack water from the Lake of the Woods to the crest of the dam. I am at present under orders to make inspection of the Lake of the Woods in the near future and propose, with the approval of the Chief of Engineers, to go to Kenora and settle the matter by taking observations with a hand level. I am inclined to think that Mr. Freeman was mistaken in his estimate, and that the dam does affect the level in the lake, because the present level is so unusual and has prevailed so long as to justify a suspicion that something is being done at the outlet.

7. It would be perfectly possible by proper works at the outlet to maintain a good depth of water in the Lake of the Woods at all times. In this particular, however, the interests of navigation and those of power development are directly opposed, the one requiring constant level and very variable discharge and the other a constant discharge with greatly varying fluctuations in lake level. It is my belief that the Canadian Government has decided for the latter alternative; intends to develop power at the outlet and has made its channels sufficiently deep to effect the bad effects of fluctuations of lake level. It is certainly to be recommended that this matter be brought to the attention of the International Joint Commission.

8. There is at present available for work at Warroad the sum of \$1,150. The work authorized under the project (as I interpret it) is nearly finished, and there will probably be \$500 left over, most of which will be needed for care of property.

Very respectfully,

FRANCIS R. SHUNK,  
Major, Corps of Engineers.

UNITED STATES ENGINEER OFFICE,  
St. Paul, Minn., June 30, 1911.

THE CHIEF OF ENGINEERS,  
United States Army, Washington, D. C.

SIR: 1. Referring to my report dated June 9, 1911 (accompanying second indorsement on E. D. 30371/83) on conditions in the Lake of the Woods, I have the honor to submit the following supplemental report based upon information derived upon the recent inspection of the outlet.

2. The Lake of the Woods discharges into Winnipeg River by three outlets, respectively at Rat Portage, Norman, and Keewatin, the three towns which have united to form the city of Kenora. The Norman outlet, which in its original condition was the principal one, is dammed but is not used for development of power. The other two outlets are dammed and are used for power development. The object of the dam at Norman is only to keep up the lake level for the benefit of the plants at the other two outlets. It is this Norman Dam which has been indicated as the probable cause of low water on the Lake of the Woods, and my inspection fully confirms this report.

3. A sketch showing the Norman Dam is herewith. The masonry piers were constructed on dry land while the river flowed through its natural bed. When the piers were completed, the river bed was filled up by a rubble mound. This mound is not at all water-tight and under the head developed, about 16 feet, it leaks badly. The openings are closed by stop logs which appear to be in very bad condition. I should also judge that sticks and other rubbish had interfered with proper contact between the stop logs, so that the leakage through them is large. Altogether the flow of the river below with the dam supposedly closed, seems to be at least equal to half the flow of the river in its natural state. This is undoubtedly one cause, and a very considerable one, of the slow recovery of normal level in that lake. I was informed at Kenora that the company manipulating the dam had opened the stop logs at the beginning of last season and that before they were closed, the lake had lost 3 feet.



The stop logs were then put in, but too late to prevent the unfortunate conditions of last season. There was certainly no ill intention in this manipulation of the dam, but it was merely a mistake on the part of the management which is admitted and which will probably not be repeated. It would not have been serious had not last season been very unusually dry, and I think that the lake would undoubtedly have recovered its normal level had the dam been water-tight as it ought to be. It is the intention of the company owning the dam to improve the condition of the stop logs as soon as opportunity offers, but as this will necessitate opening the dam, they do not wish to do it until the present crisis has gone by. It is my opinion that the rubble mound referred to ought to be made water-tight; and as the United States has a considerable interest in the regulation of lake levels, I recommend that the general question of regulation be referred to the International Commission.

4. On the Keewatin outlet there are two flour mills, having hydraulic plants with net head of about 18 feet. On the Rat Portage outlet is situated the electric power plant which furnished light and power to the city of Kenora. This also has an available fall of about 18 feet. This fall is so small that a diminution of a few feet diminishes the efficiency of the plant by a large percentage. These power plants therefore have a strong interest in keeping up the lake level, and the opposition between power development and navigation interests, mentioned in my report of June 9, which might be feared with a greater head of water, is not to be apprehended in this case. On the whole, the results of the inspection were very reassuring and I do not think that a recurrence of last season's conditions is to be looked for.

5. I also discovered by inquiry in Canada and in the United States another cause for the slight rise during the past season. Most of the tributaries to the Lake of the Woods are used for logging purposes, and it is the custom of loggers to build temporary dams in order to accumulate water for flushing their logs into the lake. Such temporary dams are especially used in low-water seasons, and this year have been built in great numbers. The consequence is that the rainfall, while it raised the level of the tributaries, was largely excluded from the lake. Recently a number of these dams have been opened and all of them will be removed in a short time. The waters of the lake rose 6 inches in about one week, June 12 to 19, and further rise is expected.

6. Conditions at Warroad are very much better than I had expected to find them. I caused soundings to be taken that indicate a least channel depth of a little less than 7 feet, at a gauge reading of 4.2. This indicates that the bottom of the dredged channel is somewhat below what I regard as its lawful position. I think that in dredging out those places which had shoaled the master of the dredge was somewhat generous in measuring his depth, but I also believe that this is hard to avoid, as the material which fills in is light and it is difficult to remove a thin layer without at the same time taking out a good deal more. The organic material, known as muskeg, which collects especially in the outer portion of the channel, is so nearly of the specific gravity of water that it scatters under the action of wheels and propellers, and the mere passage of the Government dredge, a stern wheeler, has probably done much to remove these shoals which are not so dangerous as soundings would indicate. At any rate, the boats at Warroad are running without serious trouble, and it is my opinion that the difficulty is over. I would remark that the depth at Warroad remained 7 feet or more until very late in the season of 1910 and that it was below this depth only up to June 20 (approximately) of the season of 1911. The aggregate hindrance to commerce, although certainly noticeable, was not at all disastrous.

7. During my inspection of the Lake of the Woods I visited the Canadian dredge working near the mouth of the Rainy River. The master of the dredge informed me that he is excavating a channel 200 feet wide at bottom and 14 feet deep at mean lake level during navigation season; that is to say, at a reading of 7.2 on the Warroad gauge. He further stated that the object of this depth was to give sufficient water for the deepest-draft boats at the lowest possible stage. The deepest-draft boat using the Lake of the Woods is the tug *Mather*, of Kenora, drawing 9 feet. She does not, as I was informed, visit United States waters and is not likely to do so. I took occasion to inquire as to the draft of the steamer *Kenora*, which has been mentioned in previous correspondence, and was informed that she draws, when fully loaded, 7 feet, but is commonly trimmed to 6½ feet. As my informant, the master of the Canadian dredge, was very well informed and suspected no motive in my inquiries, I think that

this is probably the truth about the *Keenora*. I may add that she has ceased to run on account of lack of patronage, and it is said that the Canadian Northern Railway has so seriously interfered with her business that she may not resume operations. This, however, is mere surmise.

8. While at Warroad I made observations as to the effect of the jetty on the channel. The bars which form at the mouth of the Warroad River have, it is believed, been caused by wave action in shoal water. During the past season, the water having been below its normal level, bars have formed farther out than is usual. The present situation of itself would indicate that the jetty ought to be extended and more particularly that another jetty was necessary on the southeastern side of the entrance. I do not think, however, that anything should be determined at once on account of exceptional conditions which have recently prevailed. It may well be that the state of things will be more favorable next year.

9. In view of the present conditions at Warroad it is not my opinion that any further work at present can reasonably be called for.

Very respectfully,

FRANCIS R. SHUNK,  
Major, Corps of Engineers.

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DEPARTMENT OF THE INTERIOR.

GENERAL LAND OFFICE.

In the matter of the application of the Minnesota Canal & Power Co. for the use of certain public lands of the United States in St. Louis and Lake Counties, Minn.

Showing of applicant before Majors George McC. Derby and Charles L. Potter, Corps of Engineers, United States Army.

Durment & Moore; Baldwin, Baldwin & Dancer; H. G. Gearhart, of counsel.  
O. H. Simonds, Duluth, Minn., applicant's attorney.

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Charles L. Potter, major, Corps of Engineers, Duluth, Minn., for report, before whom this 13th day of March, 1905, a public hearing is being held under said reference;

That on or about the 7th day of December, 1904, a reply by applicant to protests filed in said matter and proofs in support of such reply were filed with the Commissioner of the Land Office at Washington, which included an affidavit made by myself and sworn to on the 3d day of December, 1904, and that this statement is made supplementary to that reply and affidavit and relates particularly to the matters specified in the reference above mentioned.

The season of navigation on the Lake of the Woods, Rainy Lake, and Rainy River is approximately six months or from about May 15 to November 15 in each year.

George H. Kelley, superintendent of the Lake of the Woods Milling Co., at Keewatin, Ontario, near Rat Portage, has kept a monthly or semi-monthly record of the height of water in the Lake of the Woods since 1896, and the Engineering Corps of the United States Army has also made gaugings of the lake at different times and places, and during 1904 has made daily gaugings. From all the foregoing I have prepared a table showing the elevations of that



lake on the days covered by Mr. Kelley's record referring to the Warroad gauge and the same is given herein as follows:

GEORGE H. KELLEY. 1896. Elevation.		GEORGE H. KELLEY. 1897. Elevation.		GEORGE H. KELLEY. 1898. Elevation.	
May 4th	5.25	March 13th	4.63	February 22nd	4.33
May 19th	6.41	April 10th	4.75	March 13th	4.00
June 6th	7.92	April 20th	5.75	April 8th	3.67
June 18th	8.33	May 4th	6.75	April 19th	4.00
July 6th	8.45	May 25th	7.25	May 3rd	3.67
July 17th	8.95	June 9th	7.67	May 16th	3.59
August 4th	8.33	June 28th	7.92	June 3rd	3.67
August 18th	8.33	July 3rd	7.92	June 22nd	4.10
September 8th	7.58	July 21st	8.58	July 4th	4.95
September 23rd	7.58	August 6th	8.58	July 20th	5.25
October 7th	6.92	August 25th	8.25	August 3rd	5.50
October 22nd	6.50	September 23rd	7.40	August 30th	5.83
November 21st	6.13	October 5th	6.55	September 23rd	6.21
December 11th	5.92	October 28th	5.37	October 1st	6.17
		November 25th	5.58	October 20th	6.25
				November 25th	6.67
				December 20th	6.75

GEORGE H. KELLEY. 1899. Elevation.		WABROAD.		GEORGE H. KELLEY. 1900. Elevation.	
February 16th	6.75			January 8th	7.00
March 20th	6.50			February 10th	6.41
April 13th	6.25	McQuarrie		March 19th	6.00
April 19th-22d		5.81		April 14th	5.80
May 2nd	6.50	7.0 to 7.2		May 12th	5.63
May 25th				June 9th	5.59
May 26th	7.17			July 6th	5.25
June 5th	7.50			August 16th	5.05
June 7th		6.70		September 12th	6.10
June 29th	8.33			September 22nd	6.83
July 14th	8.58			October 2nd	6.92
July 14th		8.41		October 8th	7.55
July 19th		8.71		October 19th	8.10
August 5th	8.40			October 31st	8.33
August 21st	8.33			November 4th	9.10
September 5th	7.83			November 8th	8.50
September 27th	7.33			November 16th	8.60
October 2nd	7.10			December 13th	8.40
October 23rd	7.40				
November 26th	7.92				
December 2nd	7.59				
December 16th	7.41				
December 27th	7.33				

GEORGE H. KELLEY.		GEORGE H. KELLEY.		GEORGE H. KELLEY.	
1901. Elevation.		1902. Elevation.		1903. Elevation.	
February 23rd	7.10	January 20th	5.59	January 12th	6.17
March 13th	6.58	February 13th	5.40	February 26th	6.00
April 8th	6.25	March 10th	5.17	March 11th	6.41
May 8th	7.38	April 4th	5.10	April 18th	7.00
May 20th	7.58	May 8th	5.58	May 4th	7.58
June 6th	7.10	May 20th	6.58	May 22nd	7.83
July 4th	7.58	June 6th	7.33	June 9th	7.67
July 29th	7.33	June 16th	7.33	June 23rd	7.67
August 6th	7.05	June 23rd	7.17	July 8th	7.83
September 5th	7.17	July 5th	7.40	July 30th	7.00
September 21st	6.67	July 24th	7.25	August 14th	6.92
October 16th	6.41	August 4th	7.25	August 26th	6.67
November 2nd	6.67	August 22nd	7.05	September 14th	6.50
December 5th	6.17	September 3rd	6.85	October 12th	6.25
		September 5th	7.17	November 16th	5.75
		October 17th	6.05	December 18th	5.40
		November 6th	6.92		
		December 12th	6.40		

GEORGE H. KELLEY.		WARROAD.	
1904. Elevation.			
January 10th	5.25		
February 12th	5.00		
March 18th	4.63		
April 12th	4.59		
April 13th			5.6
May 10th	5.40		5.7
May 18th	6.17		6.1
June 11th	6.75		6.3
July 16th	7.25		7.1
August 23rd	6.67		6.6
September 12th	6.25		6.3
October 8th	5.59		6.1
November 7th	5.10		
November 16th	5.10		

In the original application in this matter and in the condemnation proceedings in the State courts it has been shown that the average annual precipitation over the Birch Lake Basin is 30 inches and assumed that the run-off is 40 per cent of that, or 12 inches, and various calculations have been made upon that basis, and it will be continued through this present statement and applied to the entire drainage area of the Lake of the Woods. I am aware that west of Koochiching the average of precipitation is somewhat less than at Duluth and Tower and that the conditions favorable to a large run-off are not quite so good on the American side of the Rainy River from Koochiching to the Lake of the Woods and for a narrow strip on the northerly side of the same portion of the Rainy River. All the balance of the drainage area presents conditions substantially identical with those of the Birch Lake Basin.

The topographical and geological conditions of that basin are similar to those which are to be found on the entire north shore of Lake Superior, and are more favorable for a large run-off than the drainage basin of the St. Louis River and of all that portion of the drainage basin of Lake Superior lying upon the southerly side of the lake.

Maj. W. L. Fisk, Corps of Engineers, United States Army, in his report to the Chief of Engineers for 1904, found on pages 4121-4123, presents a record of the run-off from the Lake Superior Basin for 16 years from 1883 to 1898, making his measurements of run-off at the Sault River. A synopsis of his report is given below:



Mean precipitation for 16 years, 1883-1898	inches	26.27
Land area of basin	square miles	44,074
Land area of basin		32,060
Total area of basin	square miles	76,134
Percentage of land		58
Percentage of water		42
		100

The run-off from the land equals 60 per cent of precipitation, which is 15.76 inches, equal to 1.31 feet. The run-off from the water equals precipitation, 26.27 inches, minus the evaporation, 18 inches, which is 8.27 inches, or 0.69 of a foot.

Let us apply these figures to the Birch Lake Basin. The land area of this basin is 1,033 square miles, or 28,798,387,200 square feet, and a run-off of 1.31 feet per square mile will amount in cubic feet per annum to	37,725,887,000
The water area equals 77 square miles or 2,146,636,800 square feet, which multiplied by 0.69 will amount to	1,481,180,000
Total annual run-off	39,207,067,000

This is equal to a mean flow of 1,243 feet per second, or 1.13 cubic feet per second per square mile. This is 126.7 per cent of the flow as we have hitherto estimated it, and the topography of the basin is such that most of this would appear in the flood waters and not increase the minimum flow much, if at all. In the gaugings found in the original application in this matter the flowage on August 14, 1903, was found to be 265.5 feet, which was probably not the minimum flowage. Using this run-off of 1,243 cubic feet per second as a basis of calculation we find that the diversion of 600 cubic feet per second is equivalent to taking all of the water from 530 square miles of the Birch Lake Drainage Basin. This would be 1.87 per cent of the area tributary to the Lake of the Woods. An amount equal to the entire run-off, 570 square miles, will be permitted to flow through the natural channels.

From the foregoing I think it will be perfectly fair to put the entire drainage basin of the Lake of the Woods upon the basis of a run-off of 12 inches per annum, which is equal to 0.895 cubic feet per square mile.

The inflow to the Lake of the Woods is variable, but usually reaches flood tide in July or earlier of each year. From this maximum stage there is a lowering accompanied by numerous minor fluctuations until the following spring, when the lake is usually at a low stage. The melting of the winter snow and the spring rains upon its 28,228 square miles of drainage area induce a large run-off and consequently a large inflow into the lake and the raising of its level. In its natural condition the lake is subject to fluctuations between high and low stages of about 4 feet, but since the Province of Ontario took possession of the Keewatin Dam and has operated it in the interest of navigation these annual fluctuations have been reduced to about 2 feet.

Any calculations as to the effect of diversion of a portion of its watershed must be received with the understanding that the process of reduction in depth may be and is frequently interrupted by increased run-off resulting from precipitation. From the foregoing table and other information 90 days may be said to be an extreme limit for the low-water stage during the navigation season, and, therefore, it may be unnecessary to calculate the effect of diversion for any longer period, but to furnish full information I have extended the calculations to the full period of 180 days in table No. 4 below. It is only at or near the low-water stage that it can be claimed by anyone that the diversion of 600 cubic feet or any less amount would have any effect upon the navigable capacity of the lake.

The inflow to the Lake of the Woods, as estimated, varies from 6,000 to 75,000 cubic feet per second, with a mean of 25,250 cubic feet. It is evident that 600 cubic feet will be diverted by the Minnesota Canal and Power Co. only when there is that amount or more flowing into Birch Lake. At the season of low water the run-off would not exceed 220 cubic feet per second from

this basin, which would be at such times the actual diversion from the international waterway, and should be the basis of calculation as to its effects on the Lake of the Woods, subject to the modifying influences of precipitation and the intermediate storage. In making these calculations I have assumed the effect to be limited to the top 12 inches of the various lakes and streams involved. This is an arbitrary depth taken for convenience, but greater in fact that any result of diversion, however long continued. Hence the conclusion reached as to the effect of diversion upon the top 12 inches of any of these bodies of water will apply to the whole body.

EFFECT AT PITHERS POINT, LONG SAULT, AND MANITOU RAPIDS OF DIVERSION OF 220 CUBIC FEET PER SECOND.

My former affidavit in this matter,<sup>1</sup> sworn to December 3, 1904, stated that the crest of the rapids at Pithers Point and the entire area of Rainy Lake would be lowered 1.92 inches by the diversion of 220 cubic feet per second at the time of low water. This statement is theoretically correct and would be actually so were it not for the effect of the immense storage area of Rainy Lake and the other lakes between Birch Lake and Rainy Lake through which the Birch Lake waters flow and the occasional precipitation that would be likely to occur while the process of lowering its level is taking place, which features were not taken as factors in that calculation.

There is no doubt that the chain of lakes between Koochiching and Birch Lake acts as a reservoir and holds back the flood waters, thereby retarding and lessening the flood volume, shortening the period of low water, and increasing the low-stage flow. It is a well-recognized fact that the efficiency of a chain of lakes as a regulator of the streams draining them is proportional to the percentage which their areas bears to the area of the tributary watersheds. The most striking example of natural storage and its effect in reducing the range between high and low water is the chain of Great Lakes. Above the Niagara River the water surface of these lakes is 33 per cent of the entire tributary drainage area. The average range between high and low water for a period of 25 years has been 1.16 feet. The water area of the Lake of the Woods basin is about 2,800 square miles, or 10 per cent of the total area, and applying the rule that the efficiency of storage is proportional to the water area we conclude that the range between high and low water on the Lake of the Woods should be 3.3 times 1.16 feet, or 3.83 feet, which is not far from the actual conditions prior to the construction of the Keewatin Dam, as shown by gaugings.

The storage area above Pithers Point aggregates 600 square miles, or 16,727,040,000 square feet, and a depth of 1.92 inches over the same represents a storage of 2,701,417,000 cubic feet. While the tendency of diversion would be to reduce the depth at Pithers Point in the proportion which the diverted water bore to the amount carried by the top 12 inches, the facts are that stored water equivalent to a depth of 1.92 inches would be continually flowing to the outlet, thereby retarding the effect of diversion.

With an elevation of 490 feet at Rainy Lake with reference to the Fort Francis bench mark, referred to in my former affidavit and established in connection with the proposed dam of The Koochiching Co., there is 10 feet of water at Pithers Point and 10½ feet at the Brule Narrows. Assuming that Rainy Lake is at an elevation of 490 feet and the minimum flow of 220 cubic feet from Birch Lake is withheld, all of the other flowage being constant, the outflow at Pithers Point will be 220 cubic feet per second greater than the inflow for a certain period. As the 1.92 inches of storage is reduced the flow in cubic feet per second and the elevation of the crest of the rapids at Pithers Point and over the entire surface of the storage area will be reduced proportionately. In order to estimate the reduction in flow and elevation I have divided the time consumed in draining off the storage represented by a depth of 1.92 inches into periods of 10 days; the result for any shorter period would be too small for consideration. Without entering into the details of the calculations, I will state the results at the end of the several periods in the following table:

<sup>1</sup> Pages 54, 55, 56, 57 of "Reply."



Table No. 2.

[Showing the estimated reductions in depth at Pithers Point, Manitou Rapids, and the Long Sault by reason of the diversion from these waters of the minimum flow from the Birch Lake Basin, to wit, 220 cubic feet per second. The amount of water carried by the top 12 inches<sup>1</sup> at Pithers Point is equal to the width multiplied by the mean surface velocity, or 190 feet multiplied by 7 feet, and equals 1,330 cubic feet per second, and a diversion of 220 cubic feet per second will ultimately reduce the depth in proportion to the amount diverted, or 1.92 inches.]

Period.	Cubic feet per second.	Depth of flow in feet.	Run-off during period.	Left in storage.	Reduction in depth at end of each period.
10 days.....	220	0.165	190,080,000	2,511,337,000	0.012
20 days.....	205	.153	177,120,000	2,334,217,000	.023
30 days.....	190	.1423	164,160,000	2,170,057,000	.032
40 days.....	177	.133	152,928,000	2,017,129,000	.042
50 days.....	164	.123	141,696,000	1,875,433,000	.051
60 days.....	152	.114	131,328,000	1,744,105,000	.059
70 days.....	141	.106	121,824,000	1,622,281,000	.066
80 days.....	133	.099	114,912,000	1,507,369,000	.073
90 days.....	122	.092	105,408,000	1,401,961,000	.080
100 days.....	113	.085	97,632,000	1,304,329,000	.086

<sup>1</sup> A depth far in excess of the effects of any proposed diversion.

This table shows that at the end of 90 days the level of the water at Pithers Point would be lowered at 0.08 foot or 0.94 inch.

Rainy River, including Long Sault and Manitou Rapids, having for its principal source Rainy Lake, will be affected by any diversion of those waters in the same manner as Pithers Point, so that all calculations made in my former affidavit as to Rainy River must be modified to correspond with the conditions herein set forth, and the results will be substantially identical with those at Pithers Point.

EFFECT AT PITHERS POINT AND ON RAINY LAKE AND RAINY RIVER OF THE DIVERSION OF 600 CUBIC FEET PER SECOND.

The area of the various lakes between Birch Lake and Pithers Point as stated above is 600 square miles or 16,727,040,000 square feet. The top 12 inches at Pithers Point carries 1,330 cubic feet per second at times of low water, and the diversion of 600 cubic feet per second will theoretically reduce the level of said top 12 inches 0.214 foot at the end of 90 days. The following table shows the reduction for periods named in flow and depth at Pithers Point, Manitou, and Long Sault Rapids by reason of diverting 600 cubic feet per second:

Table No. 3.

[Showing reduction in flow and depth at Pithers Point, Manitou, and Long Sault by reason of diverting 600 cubic feet per second.]

Period.	Flow per second.	Drawn off.	Left in store.	Total reduction in depth at end of period.
				<i>Feet.</i>
10 days.....	600	518,400,000	7,008,768,000	0.03
20 days.....	560	483,840,000	6,524,928,000	.06
30 days.....	520	449,280,000	6,075,648,000	.087
40 days.....	484	418,176,000	5,657,472,000	.112
50 days.....	450	388,800,000	5,268,762,000	.135
60 days.....	420	362,880,000	4,905,792,000	.157
70 days.....	390	336,960,000	4,568,832,000	.177
80 days.....	362	312,768,000	4,256,064,000	.196
90 days.....	338	292,032,000	3,964,032,000	.214

The amount of reduction in level shown by the above table would not occur if there were any precipitation to raise the water within the limits of time specified in the table.

EFFECT UPON THE LAKE OF THE WOODS OF DIVERTING 220 CUBIC FEET AND ALSO 600 CUBIC FEET PER SECOND OF WATER.

In January, 1905, I visited Rat Portage, which is at the outlet of the Lake of the Woods, and spent several days in examining the conditions there.

For many years the Province of Ontario has done something to assist in maintaining the summer level of the waters of the Lake of the Woods in the interest of navigation. Prior to 1898 it had constructed and maintained a submerged wooden dam across the principal outlet of the Lake of the Woods and also a cofferdam in Ash Rapids, which held up the waters of Shoal Lake, a tributary to the Lake of the Woods. By 1898 the cofferdam had been taken out and the sole reliance for maintaining the summer level was on the submerged wooden dam.

In 1897 the Keewatin Dam Co. of Toronto had constructed a stone dam across the principal outlet of the Lake of the Woods about 1 mile below the lower end of the lake at an expense of approximately \$150,000. This dam was built to produce power, but has never been used for that purpose.

I present herewith three photographs showing different views of the dam and also blue print of the dam and of the foot of the Lake of the Woods and its outlets, and reference is made to the same.

In the fall of 1897 and in the winter and early spring of 1898 the water of the Lake of the Woods fell to an unusually low stage and the vessel and commercial interests in that part of the country made representations to the Ontario government of that fact and urged that the dam, then lately constructed by the Keewatin Dam Co., should be utilized for the purpose of keeping up the summer levels of the lake. These representations led to negotiations, and finally, under date of June 22, 1898, a contract was entered into between the Keewatin Power Co. and Her Majesty, represented by the commissioner of public works of Ontario, under and by virtue of which the company agreed to have the stop blocks in place August 25, 1898, and the Province took possession of the dam; that the general policy of the Government in relation to that dam is set out in an affidavit in possession of the above-named applicant made by Frederick Chormann, and that a certified copy of said contract is also in possession of said applicant, true copies of which affidavit and contract are hereto attached and reference to the same is respectfully made.

The table of gaugings above referred to for 1898 shows the lowest stage of water found in the entire nine years reported upon. This low stage continued until August 30, when it had been raised to 5.83 feet, and after that the water was continually raised until December 20, when it was 6.75 feet. It is difficult to account for this raise of water except upon the hypothesis that the stop blocks had been put in and were being operated for the purpose of raising the level of the lake. At no time subsequent to 1898 did the water reach the low levels of that year. Even in 1900, which was a phenomenal year in that respect, the range was considerably higher. I have reached the undoubted conclusion that the dam has been so manipulated as to make much more uniform the level of the Lake of the Woods and increase its level at times of low water. Its manipulation has not even approached perfection, and at the time of my visit there I found a leak of about 2,100 cubic feet per second through the dam by reason of the very imperfect adjustment of the stop blocks. The water was spurting through the apertures between them with great freedom. All this could be remedied by a removal of driftwood which now lies between the blocks and the placing of the blocks regularly in the sluiceways and the leakage thereby greatly reduced. Even the present imperfect handling of the dam has been very satisfactory to the vessel interests represented at Rat Portage, of which I received abundant personal assurances while there. During my stay I made observations and measurements as to the flowage of water through the various outlets of the Lake of the Woods from which I have compiled the following table, which shows the theoretical effect upon the Lake of the Woods of the diversion of 600 and 220 cubic feet



per second, respectively, of Birch Lake waters for various periods up to 180 days, which is the entire season of navigation:

Table No. 4.

[Estimate of reduction in flow and depth of the Lake of the Woods by reason of diverting 600 and 220 cubic feet per second.]

## 600 CUBIC FEET.

Period.	Flow per second.	Drawn off.	Left in store.	Total reduction in depth at end of period.
				<i>Feet.</i>
10 days.....	600	518,400,000	38,734,387,200	0.008
20 days.....	592	511,488,000	38,222,899,200	.017
30 days.....	584	504,576,000	37,718,323,200	.025
60 days.....	576	1,492,992,000	36,225,331,200	.049
90 days.....	554	1,435,968,000	34,787,363,200	.072
120 days.....	532	1,378,944,000	33,410,419,200	.095
150 days.....	510	1,321,920,000	32,088,499,200	.118
180 days.....	490	1,270,080,000	30,818,419,200	.138

## 220 CUBIC FEET.

Period.	Reduction in depth (feet).
30 days.....	0.009
60 days.....	.018
90 days.....	.027
120 days.....	.037
150 days.....	.047
180 days.....	.056

This table shows that at the end of 90 days the level of the Lake of the Woods will be reduced 0.072 foot or 0.87 inch by the diversion of 600 cubic feet per second and 0.027 foot or 0.34 inch by the diversion of 220 cubic feet per second. Of course, the actual reduction will never be as great as above shown, especially for the longer periods as the calculations are based on the assumption that the inflow is uniform for the whole period under consideration and not increased or accelerated at any time. As before stated the process of reduction in depth is interrupted by frequent precipitation and consequent increase in run-off.

## ANOTHER METHOD OF CALCULATING THE EFFECT UPON THE LAKE OF THE WOODS OF THE DIVERSION OF 600 CUBIC FEET PER SECOND.

In order to make an estimate of the effect on elevation by reason of the diversion of any amount of water from a waterway, it will be necessary to measure the discharge of the outlet during the various stages of water and ascertain the difference in discharge corresponding to the different elevations. When this is found we can say that the difference in elevation, by reason of any diversion, is proportional to the difference between the amount of water carried at any given elevation and the amount carried at an elevation 12 inches less or approximately is proportional to the amount of water carried by the top 12 inches in cases where the aggregate effect of diversion is less than 12 inches.

Let us apply this principle to the proposition under consideration. The mean annual flow from the Lake of the Woods is, as heretofore stated, 25,250 cubic feet per second. The total width of the sluiceways in the Keewatin Dam is 350 feet and the stop blocks therein make of this dam a wide-crested weir. If the other outlets of the Lake of the Woods are closed then applying the Francis formula for the measurement of a weir of this kind we find that it would require a depth of water 8.6 feet to carry the mean flow above mentioned through the Keewatin Dam.

By means of the same formula we find that with an elevation 1 foot less than the above, or 7.6 feet, there would be carried through the Keewatin Dam 20,930 cubic feet per second, thereby showing the following result:

Amount carried with 8.6 feet head.....	25, 250
Amount carried with 7.6 feet head.....	20, 930
Amount carried by top 12 inches.....	4, 320

Now applying the principle with which we started if 600 cubic feet per second is diverted, to ascertain the amount by which the level of the lake is lowered by reason of that diversion we have the proportion 4,320 is to 1 foot as 600 is to 0.141 of a foot or 1.69 inches; that is, the level of the lake would be ultimately lowered approximately 1.69 inches by the diversion of the 600 cubic feet per second in the absence of any counteracting influence.

This demonstration is theoretical, however, and does not take into consideration the storage area of the Lake of the Woods and the storage area between Birch Lake and the Lake of the Woods and the amount of water represented by the depth of 1.69 inches over said surface. Before the full reduction could take place all the water equivalent to said depth would flow from the lake under a head varying from 1.69 inches to zero but would be modified by new precipitation and wholly overcome one or more times every year by the flood stage of water.

#### LARGE STORAGE COUNTERACTS EFFECTS OF DIVERSION.

The various lakes connecting Birch Lake with the Winnipeg River have a combined area of not less than 2,200 square miles or 61,332,480,500 square feet. It is proposed by the Minnesota Canal and Power Co. to divert from the Birch Lake drainage basin, not more than 600 cubic feet per second, which would amount to 4,665,000,000 cubic feet in 90 days, the limit of the low water stage in the navigation season. This amount of water is equivalent to 0.075 foot or 9-10th of an inch from the above storage. This calculation is made to show how small the effect would be of such diversion from this immense storage area. But when we consider that we can not take more than actual flowage during the period named and that the amount diverted during that time is somewhere between 220 cubic feet and 600 cubic feet the lowering of the level must be correspondingly reduced.

The drainage area tributary to the Lake of the Woods is 28,228 square miles. Figuring the mean annual flow at the rate of 0.895 cubic feet per second per square mile, the diversion of 600 cubic feet per second is equivalent to deducting 670 square miles from the drainage area as before stated. The extreme yearly range between high and low water on the Lake of the Woods does not exceed 4 feet and assuming that the diverted Birch Lake water contributes to this range in the proportion which said amount of water bears to the total flow, or which the diverted area bears to the total area, we will have the proportion as 28,228 is to 670 so is 4 feet to 0.095 or  $1\frac{1}{8}$  inches, that is, it is possible that the high-water stage in the Lake of the Woods might theoretically be ultimately reduced  $1\frac{1}{8}$  inches.

The diversion of 220 cubic feet per second or the estimated minimum flow from the Birch Lake basin for a period of 90 days is equivalent to a depth of a little less than one-half inch on the Lake of the Woods.

There are a number of calculations that could be made to show the relative proportion between the diverted water and the total flow and elevation of the Lake of the Woods; for instance, assuming that the mean annual flow for the entire Lake of the Woods basin is 0.895 cubic feet per second per square mile the mean flow from the Birch Lake area will be 985 cubic feet per second and the diversion of 600 cubic feet per second will be equivalent to the diversion of all the water from 670 square miles of the drainage area of the Lake of the Woods or 2.3 per cent thereof. It is not at all probable that the reduction in the amount of water delivered to the Lake of the Woods in so small a proportion as 2.3 per cent will make any appreciable difference in the elevation of the water.

#### COMPARISON WITH CHICAGO DRAINAGE CANAL.

The Chicago Drainage Canal was nearly completed before an application was made to the Secretary of War for the right to divert waters therein from Lake Michigan. In the various opinions and reports which were presented at that time bearing on the question there was a general consensus of opinion that the effect of diversion of 10,000 cubic feet per second would reduce the level of Lake Michigan and lower connected lakes from 3 to 6 inches in the course of time, and considerable opposition was developed to the granting of permission by the Secretary of War for this reason.

However, on May 8, 1899, the Secretary of War, Gen. R. A. Alger, and Chief of Engineers, Gen. John M. Wilson, granted permission to the Sanitary District of Chicago to open the drainage canal to divert water therein from Lake Michigan. The permit cited the limitations contained in the river and harbor act of



March 3, 1899, making it unlawful to alter or modify the course, location, condition, or capacity of any navigable waterway in the United States without the permission of the Secretary of War and the Chief of Engineers, and further stated that the whole matter would be referred to Congress for consideration and final action, and that the permit should be subject to such action as might be taken by that body. Pursuant to this permission the drainage canal was opened in the month of January, 1900.

The mean annual flow of water through the St. Clair River, as gathered from the reports of the Government engineers, is 195,574 cubic feet per second. The amount of water diverted from Lake Michigan through the Chicago Drainage Canal, which otherwise would pass through the St. Clair River, as reported by the chief engineer of the Chicago Sanitary District, is 4,580 cubic feet per second, equal to 2.34 per cent of the water naturally flowing through the St. Clair River.

The mean annual flowage from the Lake of the Woods as hereinbefore stated is approximately 25,250 cubic feet per second, of which the Minnesota Canal & Power Co. proposes to take 600 cubic feet per second, which is equal to 2.33 per cent of the total flowage.

It will be seen from the above that the percentage of diversion in the two cases is substantially identical, so that if we can ascertain what effect the diversion through the drainage canal has had upon the level of Lake Michigan and the lower connected lakes, it will afford us some data by which to determine the effect of our proposed diversion upon the Lake of the Woods.

In a letter to this applicant dated December 1, 1904, Isham Randolph, chief engineer of the Sanitary District of Chicago, reported that the flow through the canal from Lake Michigan at that time was 4,580 cubic feet per second and that the eventual flow would be 10,000 cubic feet per second, and that the diversion of water through the canal thus far had had no discernible effect upon the level of Lake Michigan. Upon being interrogated further by the Minnesota Canal & Power Co. as to this subject, under date of March 3, he replied as follows:

"Referring to yours of the 1st instant, in which you ask how I account for the fact that the level of the lake is not lowered by any considerable diversion of the waters, I have not made an effort to account for it. The fact that there is no appreciable diminution in the height of water in Lake Michigan is one which we accept with very great satisfaction. I do not know whether I ever told you that we opened our canal in the month of January, 1900, when the lake is at its lowest stage, the minimum levels being obtained in January and February of each year, as shown by a long period of observations. After the opening of the canal the lake rose in June, July, and August to its normal height in these months. This has continued to be the case ever since. The gauge readings for 1904 show a higher stage of the lake than at any time since 1899."

The annual means of the lake level at Chicago, Ill., from 1894 to 1904, both inclusive, as furnished by Col. R. O'S. Burke, city harbor engineer, and signed by G. A. M. Linjenerantz, U. S. assistant engineer, were as follows:

1894-----	0. 51
1895-----	— . 49
1896-----	— . 58
1897-----	. 33
1898-----	. 47
1899-----	. 53
1900-----	. 12
1901-----	. 39
1902-----	. 04
1903-----	. 15
1904-----	. 66

In reply to inquiries addressed to him by the Minnesota Canal & Power Co., O. H. Ernst, colonel, Corps of Engineers, at Chicago, Ill., under date of March 2, 1905, writes as follows:

"The natural oscillations of the lake level are so irregular and at times so violent and the variations in the discharging capacity of St. Clair River, due to ice in winter, are so great, that the effect can not be ascertained by mere observations of the gauge records. It is a complicated problem which has been carefully investigated in the office of the Lake Survey at Detroit. It was found that the permanent discharge of 10,000 cubic feet per second, which is the eventual capacity for which the Chicago Drainage Canal was designed, will

lower the lake level about 6 inches and that it will take about five years for this full effect to be produced. The canal was opened in January, 1901 (should be 1900), and the amount of water which the Secretary of War has allowed to be taken thus far has been limited to about 4,200 cubic feet per second. The effect thus far is, therefore, only a fraction of the final effect as computed."

On referring the matter to the engineer's office at Detroit we were advised that the ultimate effect on the levels of Lakes Huron and Michigan and the St. Clair River of withdrawing 10,000 cubic feet of water per second through the Chicago Drainage Canal might possibly be a lowering of approximately one-half foot and that the Detroit office having no record of the quantity of water that has been drawn from Lake Michigan through the Chicago Drainage Canal since its opening is, therefore, unable to give any definite answer to the inquiry made as to the effect already had of the diversion of water through that canal.

It is plain, I think, from the foregoing that thus far, after a lapse of more than five years, from the time of opening the Chicago Canal, no effect is discernible upon the gaugings of any waters theoretically affected thereby. Inasmuch as the diversion of water by the Chicago Drainage Canal has not materially affected the level of Lake Michigan and the lower connected lakes, or the navigable capacity of any of the connecting streams, it is reasonable to conclude that the diversion by the Minnesota Canal & Power Co. of practically the same percentage of water will not materially affect the level of the Lake of the Woods or the navigability of any of the streams between Birch Lake and the Lake of the Woods.

I submit the following as a possible reason why the level of Lake Michigan and the lower connected lakes and intermediate streams has not been lowered by the diversion of water through the Chicago Drainage Canal. The annual variations in the level of the lake has the effect, it seems to me, of overcoming the theoretical reduction in the level caused by the diversion of water through the Chicago Drainage Canal. The mean annual run-off from the Great Lakes, as measured in the Niagara River and reported by the United States engineers, is 7,341 billion cubic feet which is equivalent to a depth of 3 feet over the surface of said lakes and results in the mean annual fluctuation of 1.16 feet.

The run-off from the Lake of the Woods is 786 billion cubic feet, which is equivalent to 17.48 feet over the surface of the lake and has resulted in mean annual fluctuations of approximately 4 feet, in the natural condition of the lake or approximately 2 feet during the operation of the Keewatin Dam. In comparing the effect of diversion from the Lake of the Woods with the effect on the Great Lakes, caused by the operation of the Chicago Drainage Canal, we must take into consideration the effect which this large amount of inflow, in proportion to the surface area, must have in checking the process of reduction and frequently raising the level of the lake.

The estimates made by Government engineers and by the engineers in charge of the Chicago Drainage Canal showed that theoretically there can be an ultimate reduction of from 3 to 6 inches in the level of Lake Michigan and the lower connected lakes by the proposed diversion of water, but this theoretical reduction has been overcome and wiped out each year by the annual variation in the level of the Great Lakes which is shown to be 1.16 feet. As soon as the theoretical reduction in levels gets started each year it is overcome by the flood below the lake which, doubtless, accounts for the fact that there is no permanent reduction in the level of the Great Lakes.

If a mean annual variation of 1.16 feet will completely overcome and wipe out the theoretical reduction in the level of the Great Lakes, how much more certainly and effectively will the mean annual variation of 4 feet in the level of the Lake of the Woods wipe out the theoretical effect by the diversion of 600 cubic feet per second from the Birch Lake Drainage Basin, especially since this diversion bears the same ratio to the outflow from the Lake of the Woods that 4,580 cubic feet per second through the Chicago Drainage Canal bears to the flow through the St. Clair River.

Furthermore, the surface area of the Great Lakes is so large in proportion to their drainage area that the flood level of the lakes occurs with comparative regularity as to time and extent, but the surface area of the Lake of the Woods is so small in proportion to its drainage area that the level of the lake is raised more frequently and often several times during each year, so that the theoretical effect of our diversion is wiped out several times each year. The process of reduction in level caused by the proposed diversion would be slow and it would require a number of years to reach the ultimate theoretical reduction without any counter influences. The period between the high and low



elevations of the lake is only a fraction of a year. If the period required to reach the ultimate theoretical reduction were shorter than that between the high and low water stage, then the low level of the lake might be permanently reduced, but such is not the case.

From all the foregoing considerations, it is my belief that the proposed diversion of water by the Minnesota Canal & Power Co. will have no discernible effect upon the level of the water in the Lake of the Woods or the intermediate waters between Birch Lake and the Lake of the Woods or upon the navigable capacity of any of said waters.

#### EFFECT OF KEEWATIN DAM.

The consideration of the subject thus far has proceeded mainly along the lines of the natural condition of lakes and streams involved. There are, however, a number of ways by which these natural conditions can be improved and all theoretical effects of the diversion of Birch Lake waters may be wholly eliminated so far as the navigable capacity of these waters is concerned. Some of these are now in partial existence or on the eve of construction and others could be brought about with small expense. I will proceed to mention such as occur to me.

The soundings at Warroad made by the United States engineer in December, 1899, were taken with the water at an elevation of 1,007.2 feet, which elevation seems to have been used as a datum. The Government records show that the maximum gauge readings at Warroad in 1904 were 1,007.2 feet and that for a part of one day only. Aside from the effect of the dam there is no reason why the water in the Lake of the Woods should be as high in 1904 as in 1899.

The mean annual precipitation at Duluth since 1872 is 29.95 inches, as will appear by the record of precipitation kept by the Weather Bureau at Duluth from November 1, 1870, to December 31, 1904, copy of which is appended hereto and which shows the monthly precipitation for the period named. I also append copy of record kept at Tower, Minn., from June, 1895, to April, 1904, when the office was discontinued, which shows an average precipitation about 10 per cent greater than at Duluth during this period.

The mean precipitation from January 1 to July 1 is 13.57 inches; the precipitation for 1898 for these months was 9.25 or 69 per cent of normal; the precipitation in 1899 for same months was 15.24 inches or 112 per cent of normal; the precipitation for 1900 for the same months was 3.99 inches or 29 per cent of normal; the precipitation for 1901 for the same months was 14.33 inches or 105 per cent of normal; but the precipitation for the entire year was but 26.68 inches or 89 of normal. The precipitation for 1902 to July 1 was 10.87 inches or 80 per cent of normal; the precipitation for 1903 to July 1 was 9.86 inches or 73 per cent of normal; the precipitation for 1904 to July 1 was 8.88 inches or 65 per cent of normal. I have quoted the precipitation record of Duluth as it is the nearest Government station to this drainage area at which complete records have been taken for a long period.

Now it is a well-recognized fact that the percentage of run-off from the precipitation prior to July 1 is much larger than from that which occurs later in the year. From this we can conclude that the precipitation and run-off prior to July 1 largely dominates the stages of water during the season of navigation. The soundings at Warroad having been taken at the end of a season of unusual precipitation and without much, if any, previous record as to high, mean, or low water, were referred to datum of 7.20 at least .9 of a foot higher than normal water level, and we can scarcely expect that elevation to be maintained in years of low precipitation in the natural condition of the lake and harbor. Mr. C. W. Raynor, in his report to Maj. Abbot, dated February 5, 1900, practically says this.

I find that for the past nine years the water has been at or above 7.20 for 27 months, and below said elevation for 36 months, only that portion of the year from May 1 to December 1 being considered. As further proof that unusual high water existed in 1899 I will refer to the precipitation at Tower, Minn., for that year. From January 1 to July 1 the precipitation was 15.6 inches or 122 per cent of normal, and for the entire year 35.9 inches or 120 per cent of normal. Now, referring to Newell's run-off curves and using the curve for steep slopes and impervious soil, which are the conditions over at least 75 per cent of this watershed, I find that the run-off from a 35.9-inch precipitation is 135 per cent of the run-off from a 30-inch precipitation; that is, the run-off for 1899 was 135 per cent of normal as compared with the precipitation of 25.32 inches, or, using Newell's curves, a run-off of 70 per cent of normal in 1904.

All of the foregoing tends to show that the conditions were such as to produce an unusually high stage of water in the Lake of the Woods in 1899, and an unusually low one in 1904, and that the failure to properly manipulate the Keewatin Dam was not the primary cause of the low water of the past year. Mr. C. W. Raynor further says that on the 14th of July, 1899, the Warroad gauge read 8.41 feet, which, according to Mr. McQuarrie, is 2.1 feet above normal, making normal water in the Lake of the Woods 6.31 instead of 7.20. If we call 6.31 the normal elevation we will find that the elevation of said lake was at or above normal for the months of June, July, August, and September, 1904, notwithstanding the very low precipitation prior to July 1. Mr. Raynor's report further states that in 1899 6 feet of stop blocks were removed from the Keewatin Dam, and consequently the dam had no effect on the elevation of the Lake of the Woods, the water at the dam being 6.6 feet below the lake level with strong rapids between. Mr. Raynor expresses his belief that the wet season had something to do with the elevation of the water in the lake notwithstanding the action of the dam. (See p. 2360.)

There is no doubt as to the reason for the removal of the stop blocks from the dam, as its extreme height was 11.5 feet, and with the lake elevation at 8.41 feet, or within 3.1 feet of the top of the dam, with 350 feet of sluiceways open to a depth of 6 feet, the necessity for removal is evident, there being no overfall in the dam, and no provision for disposing of flood water except by removing the stop blocks.

There can be no question as to the capacity of the Keewatin Dam for controlling the elevation of the Lake of the Woods. At the time of my visit, January 1, 1905, there was at least 2,100 cubic feet per second leaking through the stop blocks, and at the higher stages of water the leakage must have been much larger. The west channel is tightly closed by dams, and no flood water passes through. The east channel is very narrow, and could not possibly dispose of even the minimum flow without raising the water in the lake 3 or 4 feet, and if the dam were properly administered the lake would never drop below 7.20.

As near as can be ascertained, the stop blocks were placed in the Keewatin Dam in August, 1898. Let us compare the elevation of the Lake of the Woods during that season with the elevations during 1900, a year of very low precipitation and especially low prior to July 1st. As above stated, the precipitation from January 1st to July 1st, 1898, was 9.25 inches, or 60 per cent of normal, and the elevation of the lake was as follows: May, 3.59; July, 5.00; December, 6.75. In 1900 the precipitation from January 1st to July 1st was 3.99 inches, or 29 per cent of normal, and the lake stood at following elevations: May, 5.63; July, 5.25; December, 8.4. You will observe that in May, 1900, the water was 2.04 above the elevation of May, 1898, and that from July, 1897, to May, 1898, the drop was 5.00 feet. Also from July, 1899, to May, 1900, the drop was 2.95 feet; that is, the stop blocks caused an elevation in May, 1900, of 2.05 feet above that of the former year.

In the natural order of events the lake should reach its maximum elevation in July and gradually lower through the fall and winter. We find, however, that in 1898 (soon after the stop blocks were placed) the lake began to rise and continued to do so till November. During this period the precipitation was much below the normal and not sufficient to result in the above elevations, which can only be accounted for by the action of the stop blocks in the Keewatin Dam. In 1900 the run-off for the first six months was very small and the lake continued to fall until August, when it began to rise as the result of the heavy precipitation in August and September, and in November reached 9.1, the highest elevation of which I have any record. This maximum elevation of 9.1 was during a year of unusually low precipitation, as before stated, which further shows effect of stop blocks.

Further, you will observe that the range between high and low water has been materially lessened since the blocks were placed. The range for 1896-7-8 being 3.70, 3.95, and 3.16, respectively; for later years as follows:

1899-----	2.33
1900-----	4.05
1901-----	1.41
1902-----	2.30
1903-----	2.43
1904-----	2.66

The range in 1900 was caused by the unusually high stage in November, which was more than 1 foot above the average high water. This material



reduction in range shows that the stop blocks have a decided effect on the elevation of the lake, and the more perfect the adjustment of said blocks the better will be the result in maintaining an even stage in the lake.

I was informed by Mr. N. LeMay, the dam tender, that he had orders to remove and replace the stop blocks as soon as the conditions would permit. He stated that he could place the blocks so that there would be very little leakage. I was informed during my visit to Rat Portage that the dam was under the control of the Ontario government for the purpose of maintaining a navigation stage in the Lake of the Woods and that there had been no complaint from vessel owners since the construction of the dam. In my opinion if the Keewatin Dam is properly operated a continuous stage of water could be maintained at Warroad during the navigation season at the datum of 7.2 feet and that in such case a much larger diversion of water than that proposed by the above applicant would not reduce the level of the water in Warroad Harbor.

#### EFFECT OF KOOCHICHING DAM.

The statements in my former affidavit with reference to the Koochiching Dam and its effect upon the elevation of the water in Rainy Lake and at Pithers Point were based upon an elevation of 496 for the crest of said dam.<sup>1</sup> Since making that affidavit the elevation of said dam has been fixed by agreement between the Koochiching Co., or its successor, and the Province of Ontario at 497.

When the dam is so constructed the minimum depth of the water at the crest of Pithers Point Rapids will be 17 feet and at Brule Narrows 17½ feet, and after the proposed diversion of the waters of the Birch Lake Drainage Basin at the time of the minimum flow the water at said Pithers Point will be reduced less than seven-eighths of an inch after said minimum flow has continued for a period of 90 days, leaving the depth of water at Pithers Point 16 feet 11½ inches and the depth of water at the Brule Narrows 17 feet 5½ inches. With the crest of the dam at 497 the elevation of Rainy Lake will be 4.5 feet above the stage of August, 1904, at which time I was present and observed that the largest boats plying on said waters had no difficulty in passing up and down said watercourse over said Brule Narrows and Pithers Point Rapids. The effect on Rainy River stated in my former affidavit would not be changed by the added height of 1 foot to the dam.

Rainy Lake is the largest of the connecting lakes, and affords the ideal site for a compensating reservoir. Its area is 330 square miles, or 9,200,000,000 square feet. The low-water elevation of this lake is 489, and the high-water elevation is 497 (as referred to the Koochiching Water Power Co.'s bench mark at Fort Frances), a range of 8 feet, which represents a storage of 73,600,000,000 cubic feet. This amount of water will afford a flow of 9,460 cubic feet per second for 90 days. During this time there would be flowing into the reservoir an amount of water equal to the minimum flow.

The area tributary to Rainy Lake is 17,000 square miles and the minimum flow has been measured by Mr. Fanning and ascertained to be 3,500 cubic feet per second, or approximately 0.2 cubic foot per second per square mile of tributary area.

This amount of water added to the reservoir during said 90 days would be sufficient for said flow of 9,460 cubic feet for a further period of 30 days, or a total of 120 days. This flow will produce a navigation stage on Rainy River and maintain the elevation of the Lake of the Woods.

If the Koochiching Co. should construct a dam at the outlet of Rainy Lake at an elevation of 497 feet all of the above conditions would be fulfilled. The capacity of the reservoir would be as above stated and it would require very nearly the said flow of 9,460 cubic feet per second to produce the proposed 20,000 horsepower. It appears, therefore, that under the above conditions the effect of the Birch Lake diversion will be entirely eliminated, the flood flow in the Rainy River will be largely reduced in the process of accumulating 73.6 billion cubic feet of water, and the minimum flow more than doubled. I estimate the annual flow into Rainy Lake at 474 billion cubic feet, or enough to fill the reservoir more than six times.

The effect of the proposed Koochiching Dam upon the navigable capacity of Rainy Lake and Rainy River is well stated by Mr. J. T. Fanning, consulting engineer for the Koochiching Co., one of the protestants in this proceeding, in a letter dated November 3, 1900, addressed to Maj. D. W. Dockwood, United States Engineer at St. Paul, Minn., a copy of which letter is hereto attached.

<sup>1</sup> Pages 56 and 57 of "Reply."

## FEASIBILITY AND EFFECT OF RESERVOIR IN NAMAKAN LAKE.

If it is required that a reservoir be provided for the sole purpose of compensating for waters diverted we may consider Namakan Lake which, with its connecting lakes at the same elevation, has an area of 126 miles with a range of about 5 feet between high and low water, which is equivalent to a storage of 17.5 billion cubic feet, almost identical with the amount to be diverted by the Minnesota Canal and Power Co. The drainage area tributary to this lake is 6,961 square miles with a minimum runoff of 1,400 cubic feet per second. The above storage will afford a flow of 3,500 cubic feet per second or  $2\frac{1}{2}$  times the minimum flow for 92 days. The yearly flow into this lake is 176 billion cubic feet in excess of amount of Birch Lake waters to be diverted, or sufficient to fill the proposed Namakan Lake Reservoir 10 times. Dams at the outlet to this lake, when the natural fall is 10 feet, with sluiceways properly manipulated, would far more than compensate for the diversion of the Birch Lake water. The natural outlet of Namakan Lake consists of two narrow channels, one about 100 feet wide, and the other about 175 feet wide, with steep rock outcropping on each side and with good holding ground for dams. These dams could be constructed at a small cost compared with the results to be accomplished and need be only about 10 feet high.

## FEASIBILITY AND EFFECT OF RESERVOIR IN CROOKED LAKE.

Crooked Lake has an area of 20 square miles with a range of not less than 7 feet between low and high water. The topography on the American side at Curtain Falls (the outlet of the lake) is such that a sluiceway could be cut through the natural rock dam and the water drawn off to a depth of 5 feet below low water. This would make the total available depth 12 feet and afford a storage of 6,690,700,000 cubic feet. This amount of water would furnish a flow of 1,200 cubic feet per second or three times the minimum flow for 90 days.

The runoff from the area tributary to this lake, not including the area diverted by the Minnesota Canal and Power Co., is 36 billion cubic feet, or enough to fill the reservoir  $4\frac{1}{2}$  times. It is evident that it will be possible to furnish this flow of 1,200 cubic feet per second for the entire period of low water during the season of navigation and that it will compensate for the proposed diversion. This water will raise the level of the Lake of the Woods 0.15 foot, which is more than our diversion could possibly lower it. Another favorable feature is that the flow will be furnished when it is most needed. It will not come down with the floods and be largely wasted, but held back at such times and very much improve the present conditions. These waters could be reservoired by a dam 140 feet long and 14 feet high for which there is rock foundation and high rocky banks on each side. The natural fall at the foot of Crooked Lake is 28 feet.

## EFFECT OF ADDITIONAL BIRCH LAKE STORAGE.

By enlarging the reservoir system of the Minnesota Canal and Power Co. the surplus water of the Birch Lake Drainage Basin, amounting to upward of 12 billion cubic feet annually stored therein, can be released when it will best promote the public interest.

If the Minnesota Canal and Power Co., in carrying out its proposed enterprise, shall, as a result thereof, lower the level of the Lake of the Woods, and if the lowering thereof is not compensated for by the manipulation of the Keewatin Dam, the construction and operation of the Koochiching Dam, the construction of reservoirs in Namakan Lake or Crooked Lake and the controlling of the surplus water of the Birch Lake Drainage Basin, then there remains the possibility of the company making compensation by contributing an equitable amount toward the dredging of the Warroad Harbor to an additional depth equal to or greater than any decrease in the level of the lake caused by its diversion of water.

E. B. BANKS, *Engineer.*

Approved:

GEO. B. BURBANK, *Chief Engineer.*

In the matter of a dam, maintained by the Keewatin Power Company, Limited, at Rat Portage, Ontario.

STATE OF NEW YORK, *County of Niagara*, ss:

Frederick Chormann, being duly sworn, deposes and says that he is of full age and resides at the City of Niagara Falls, New York, where he is engaged in practicing his profession as Attorney and Counsellor at Law.



That on the 7th day of March, 1905, deponent went to the City of Toronto, Ontario, for the purpose of making inquiries concerning the Keewatin dam at the outlet to the Lake of the Woods at Rat Portage, Ontario.

Deponent went to the Department of Public Works and met Mr. Archibald W. Campbell, the Assistant Commissioner of Public Works, and was informed that the Commissioner was absent from the office. Deponent then asked of said Campbell the following question:

"What is the future policy of the Department of Public Works of Ontario, as to the Keewatin Dam at Rat Portage, and the using of the same for the purpose of regulating and making uniform the depth of water in the Lake of the Woods, in the interests of navigation?"

In reply to said question, said Archibald W. Campbell informed deponent that: "The Government desires and will maintain the level of the Lake of the Woods for navigation purposes. That that is the only interest which the Government has in the property and that the Government assumes to do this in all places in this District. That there is sufficient water in this District of Rat Portage to maintain a sufficient level for navigation purposes, if the proper means are adopted to store and control it. That the navigation on the Lake of the Woods is of considerable importance, there being large lumber mills at the outlet of Rainy River and important commerce on the lake.

Deponent then asked the said Campbell the following question:

"Has the Ontario Government such control over the situation in reference to the charge of the dam and the control thereover as to enable the Government to use it for the purpose of regulating the depth of water in the Lake of the Woods?"

That in reply to said question, said Campbell stated, that the Government had; that it had entered into an agreement with the Keewatin Power Company, Limited, and had paid the Keewatin Power Company, Limited, under the provisions of said contract Four Thousand Dollars (4,000) and that it could use said dam for the purpose of regulating the height of the water in the Lake of the Woods and that the agreement provided therefor. That said dam was now in charge of a caretaker, named Napoleon Lemey, whose Post Office address was Norman, Ontario, who also acts as an inspector of the dam.

That hereto attached is a certified copy of the agreement referred to by said Commissioner, as entered into between the Keewatin Power Company, Limited, and the Crown; which agreement is a true and correct copy of the one on file in the Department of Public Works of the Province of Ontario, the same having been carefully compared by deponent.

That said Deputy Commissioner of Public Works further advised deponent that it was the intention of the Ontario Government to permanently maintain the waters of the Lake of the Woods at such level as to permit of navigation thereon, and that if other propositions are made for the development of the surrounding country the policy of the Government would be to assist in the erection of such works necessary to raise the level of the water in the Lake of the Woods and its tributaries, and if necessary they would raise the dam known as the Keewatin dam.

FREDERICK CHORMANN.

Subscribed and sworn to before me this 8th day of March, 1905.

FIRNUM G. ANDERSON,  
*Notary Public, Niagara County.*

[Notarial Seal.]  
Copy.

This agreement made the 22nd day of June, A. D. 1898, between The Keewatin Power Company, hereinafter called the Company, of the first part, and Her Majesty, represented herein by the Commissioner of Public Works, hereinafter called the Commissioner, of the Second Part.

Whereas the Company have constructed a dam across the west branch of the Winnipeg River at Tunnell Island at or near the Lake of the Woods.

And Whereas for the purpose of improving the navigation of the said lake it is expedient that the said dam should be improved by the addition of stop logs and otherwise.

And Whereas it has been agreed by and between the parties hereto that in consideration of the sum of Four Thousand Dollars and other stipulations and conditions herein contained that the said Company will make all the necessary improvements, and will also permit the same to be used for the improvement of such navigation as aforesaid.

Now this indenture witnesseth as follows:

The Company covenant and agree to put in all necessary stop-logs, to fill the different openings a sufficient height to maintain the water of the Lake of the Woods at ordinary summer level, together with not less than two windlasses or winches furnished with chains, racking and other necessary and latest appliances for raising or lowering the stop-logs so far as the same may be required to properly regulate the height of the water, such winches or windlasses to be of such construction as to enable any of the logs to be raised with ease by four men.

The Company also covenant to provide and lay all such tracks as may be necessary to enable the winches or windlasses to be easily moved from opening to opening throughout the entire length of the dam, and that they put in all the stop-logs and properly test the appliances for taking them out and replacing them to the satisfaction of the engineer to be named by the Government of the Province, and that they will place the Commissioner in possession of the entire plant in thorough working order complete in every respect for use by him or the officers or servants of his Department for the purpose aforesaid on or before the twenty-fifth (25) day of August, 1898—and that they will also renew or repair the stone work and other permanent portions of the dam from time to time as may, in the opinion of such engineers, have become unsafe or unfit for further service.

The Company also covenant and agree that they will provide a stop-log platform of sufficient size to receive all the stop-logs when taken out of the different openings in the dam.

The Company further covenant and agree that the Commissioner shall have the right to regulate the height of the water and to control the dam as may be necessary.

In consideration of the foregoing covenants the Commissioner agrees to pay to the Company the sum of Four Thousand Dollars, Two Thousand Dollars when the work is completed to the satisfaction of the Government Engineer and certified to by him and Two Thousand Dollars on the first day of May, 1899.

The Commissioner also agrees to appoint and pay the caretaker and such workmen as may be required to regulate the stop-logs to be placed in the dam as aforesaid.

It is further agreed that should the company require to use the dam for power purposes they may terminate this agreement on giving one month's notice in writing to that effect, and thereafter the Commissioner shall be relieved from further charge of the said dam, but it shall nevertheless be the duty of the Company to maintain the water at ordinary summer level for such purposes as aforesaid at all proper time and times thereafter.

It is also agreed that the Commissioner is not to be responsible for damages occasioned by reason of the water being raised higher than ordinary summer level unless the same is raised for the purpose of and at the instance of the Government or by their servants or agents.

It is further agreed that should the Commissioner desire to do so he shall be entitled to surrender the charge of the dam to the Company at any time on giving one month's notice in writing, and thereafter all further responsibility on the part of the Commissioner and the Government shall cease.

It is also agreed that on such surrender the stop-logs and the appliances connected therewith shall be delivered over in good repair, damage arising from ordinary wear and tear excepted.

In witness whereof the said The Keewatin Power Company has hereunto affixed its corporate seal, and the said the Commissioner of Public Works has hereunto set his hand and the seal of the Department of Public Works, the day and year first above written.

(Signed)

RICH. FULLER, *President*, (L. s.)

(Signed)

WM. HARTY, *Commissioner*, (L. s.)

*Public Works, for Ontario.*

Witness,

(Signed) J. A. CULHAM.

Witness,

(Signed) ROBT. MCCALLUM.

Certified a true copy of the original agreement of Record in the Public Works Department.

Toronto, 7th of March, 1905.

(Seal Department of Public Works.)

H. F. MCNAUGHTON,  
*Sec., P. W. D.*



D. W. LOCKWOOD,  
Major, Corps of Engineers, United States Army,  
St. Paul, Minn.

SIR:—I have your letter of November 1st, relating to the dam proposed to be constructed across the Rainy River at Koochiching Falls.

In response to your request, I take pleasure in stating some of the facts relating to the location, construction, and conditions of the proposed water power on Rainy River at Koochiching Falls.

Rainy River is the outflowing stream from Rainy Lake and its waters flow into the Lake of the Woods. The river forms a part of the international boundary between the United States and the Dominion of Canada. Koochiching Falls abuts on the American shore in section 27, township No. 71 north, range No. 24 west of the fourth principal meridian in Minnesota.

The country bordering on both shores of the Rainy River is generally flat and the soil alluvial. The river shores are believed to be a part of the bed of the ancient Lake Agassiz. At the outlet of Rainy Lake there are two rapids of slight fall, and also, about 35 miles below Koochiching Falls there are other rapids of slight fall. At each of these points ridges of granite rock cross the river and form the rapids, making dangerous points in the navigation of the river.

At Koochiching Falls there are three ridges of granite, two of which cross the stream at nearly right angles and form falls. The third projects from the Minnesota shore past the center of the stream and there dips down under the channel but forms an obstruction to the approach of the stream to the falls. The falls are of sufficient height to prevent navigation past them except as to the floating of logs downstream and over the falls.

From September 3 to September 5, I observed the levels of the river both above and below the falls as compared with the Dominion benchmark, an iron bolt set in the rock near the center of the east side of the canal lock excavation, which said bench mark is at assumed altitude plus 500.

Representative levels above and below the falls are as follows:

	Above falls.	Below falls.	Fall.
			<i>Feet.</i>
1900, September 3.....	486.718	462.983	23.735
1900, September 4.....	486.772	463.260	23.512
1900, September 11.....	487.507	466.764	20.743
1900, September 12.....	487.611	468.431	19.180

Marks pointed out by residents as indicating the highest observed flood line above the falls were at altitude plus 500.

An iron bolt fixed in the rock, stated by residents to have been the height of the highest observed flood line below the falls, was at altitude plus 478.958.

The levels taken on September 3 show the river as it was at the end of a long and unusually severe drought and are believed to indicate a stage but little above the extreme low level of the river. A rainy season had just then commenced and rains, each day until the 12th of September, caused the river to rise gradually above the falls and to rise below the falls. The rapid rise in the level of the river surface below the falls was due largely to the effect of a considerable flood in the Little Fork River which empties into the Rainy River from the southerly side about 12 miles below the Koochiching Falls. The Little Fork flood backed the water up in the Rainy River at the foot of the falls and caused a more rapid rise below than was occurring above the falls.

The descent at Koochiching Falls varies according to the stage of the river and ranges ordinarily between 19 and 24 feet. The ordinary fall at medium low water is about 23.75 feet.

On September 5, 1900, an approximate measure was made of the flow of Rainy River, by a series of float measurements taken in the channel immediately above the falls, in the location found to be the most favorable for the purposes.

The computed flow was 3,431 cubic feet per second which is believed to be but little in excess of the extreme low flow. At the times of the measurement the river had risen slightly as a result of the rains of a few days previous.

The ordinary low flow of the Rainy River at Fort Frances and Koochiching Falls was estimated to be about 3,500 cubic feet per second, one half of which pertains to the riparian right of the American shore and the other half to the riparian right of the Canadian shore.

A cross section of the stream at the crest of the falls was made for the purpose of estimating the flood flow of the stream and it was estimated that, when the depth of water upon the mean of this crest was 9 feet, the flood flow would be 32,500 cubic feet per second and when the depth was 11 feet the flow would be 44,250 cubic feet per second. The depth would be a little less than 11 feet when the surface of the water was at plus 500 above the tongue of rock extending, in part across the river from the American shore, a short distance above the falls.

In the plan for the development of the water power of the falls it is proposed to place the crest of the dam at altitude plus 494 and to introduce in the dam a sufficient number of sluices that the space above them would form a part of the overflow weir of the dam.

When the flood level is at plus 497, or 3 feet depth upon the crest of the dam, it is estimated that the crests and sluices will discharge 48,000 cubic feet per second or a volume equal to an unusually great flood flow of the stream. The location of the dam is below that of the upper crest of the falls.

There is also an obstruction to the flood flow approaching the crest of the falls, the third ridge of rock above mentioned. This obstruction is the tongue of rock projecting from the American shore past the line of the center of the crest of the falls. This tongue of rock is only in part covered by flood flow of the stream. It is proposed to increase the water passage of approach to the crest of the dam and the sluices by the removal of a part of the tongue of rock above mentioned thus increasing the flood channel to the extent of 2,500 square feet of cross section and also to remove a part of the crest of the ledge on both sides of the site of the log sluice, thus increasing the cross section of the stream through the crest ledge at the falls to the extent of 5,500 square feet of cross section.

As a result of this enlargement of cross section it is believed that the flood level above the tongue at the crest of the falls will be reduced not less than 2 feet, or from plus 300 to plus 498, and then that the dam and sluices will discharge this flood with a crest level at approximately plus 497.

The ridges of rock which form the falls are, in large part, an excellent quality of granite. It is proposed to construct the dam and its sluice walls of this granite. With the crest of the dam at plus 494 there will be considerable available storage of water in the lake which will be brought into use by drawing down the lake to a level lower than the crest of the dam. It is probable that an average of at least 26 feet head will be obtained. After allowing 1 foot for passage of the water through the head racks and sluices there will then be a net average head of 25 feet.

A flow of 3,500 cubic feet per second on 25 feet head will give to each riparian owner of the stream 3,977 net continuous horsepower, if turbines of 80 per cent efficiency are used, at times of low flow and without the aid of storage. This approximate minimum natural power will be increased in proportion to the advantage taken of artificial storage. It is estimated that the power may be increased by storage to approximately 10,000 net horsepower for each riparian owner.

The storage of water in the lake will more evenly divide the flow throughout the year. The dam will be of sufficient height to flow out the low rapids at the outlet of Rainy Lake and will thus greatly improve the navigation at that point. The more even flow of water, and especially the increased flow at time of ordinary low water, will greatly improve the navigation past the Manitou Rapids, which are below Koochiching Falls. About 25 years ago the Canadian Government commenced the construction of a lock for the passage of boats past Koochiching Falls. The work progressed so far as to about two-thirds complete the rock excavation necessary for the construction of the lock. The work was then abandoned and has not since been resumed. The necessity for the lock will, perhaps, be less hereafter as a railway will soon be completed which will extend from Port Arthur, and connection with the Canadian Pacific Railway system on Lake Superior, along the northerly shore of Rainy Lake, through the town of Fort Francis at the Canadian end of Koochiching Falls, past the southerly end of Lake of the Woods and extending to Winnipeg in Manitoba, and there connecting with several railway systems. This railway will provide



a more convenient means of approach than the river route for the Canadian freight and passenger traffic of the Rainy Lake district.

It is probable, also, that branches from American roads will soon reach the vicinity of Koochiching Falls from the southwest and from the south. There has never been American commerce of any extent on Rainy River below the falls. In consequence of the approach of the railways to Koochiching Falls on both shores it is probable that the river traffic, which has been almost wholly Canadian, will hereafter decline.

The Koochiching company, that has been granted the right by Congress to construct this dam, owns the shore and riparian rights on the American side extending from  $1\frac{1}{2}$  miles above to  $2\frac{1}{2}$  miles below Koochiching Falls, and extending about 1 mile southerly back from the river opposite Koochiching Falls. The Koochiching company has made application to the Canadian Government for the right, in connection with Canadian parties, to extend their dam from the American to the Canadian shores in accordance with the general plan of works which is presented to you.

The topography in the vicinity of the falls and the form and general method of construction of the dam are shown on plans which are presented to you herewith.

Respectfully submitted.

J. T. FANNING, *Consulting Engineer.*

MINNEAPOLIS, MINN., November 3, 1900.

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

Station: Duluth, Minn.

Data: Precipitation (in inches and hundredths).

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	An- nual.
1870.....											1.17	0.09	.....
1871.....	2.44	1.32	1.18	3.97	1.40	3.16	4.73	2.14	3.15	4.19	1.47	2.05	31.20
1872.....	.86	.46	.85	1.80	4.62	4.46	5.84	2.84	5.01	.42	2.48	.48	30.12
1873.....	.75	.93	2.29	.30	3.89	9.90	8.50	2.45	5.16	3.31	1.59	.66	38.73
1874.....	.58	.61	1.82	.49	1.80	10.89	2.62	5.62	5.59	3.07	1.97	1.37	36.43
1875.....	.86	.98	2.17	2.82	2.45	1.84	.47	6.19	3.77	2.60	1.69	1.10	26.94
1876.....	.69	1.03	2.16	1.99	3.74	4.69	4.03	3.93	4.21	2.15	2.79	.87	32.27
1877.....	1.45	.10	.79	1.20	7.24	4.89	3.57	1.48	5.67	4.92	1.05	1.95	34.31
1878.....	.55	.32	1.34	5.18	2.83	4.81	2.53	.52	4.68	3.55	.69	1.09	28.09
1879.....	.72	1.46	1.91	.90	7.99	5.57	10.42	1.58	5.24	3.95	1.65	3.89	45.28
1880.....	1.21	1.57	2.43	3.17	4.31	10.40	1.98	4.35	1.86	2.32	2.92	1.64	38.16
1881.....	1.65	1.79	1.46	1.10	1.77	2.52	1.84	7.36	11.52	3.76	2.58	.20	37.55
1882.....	.57	2.02	3.05	2.51	7.14	6.72	4.72	3.47	1.29	3.47	1.66	1.11	37.74
1883.....	1.12	.78	.38	1.20	2.07	4.14	2.43	.98	2.21	3.19	1.63	3.02	23.20
1884.....	.67	2.71	1.32	3.64	5.17	1.13	3.45	6.92	4.70	3.47	.95	1.22	35.35
1885.....	.61	.32	.77	.89	1.53	4.82	3.46	2.51	2.35	.79	1.37	.54	19.96
1886.....	2.26	1.81	1.07	4.96	1.93	5.35	1.43	2.23	6.05	2.45	2.84	.93	33.37
1887.....	1.62	.81	.55	1.58	4.93	2.71	4.17	1.53	2.68	3.34	1.99	2.65	28.56
1888.....	1.53	.34	.81	1.97	4.12	5.54	3.86	4.17	2.27	1.68	.87	.25	27.31
1889.....	1.34	1.38	1.67	3.35	2.05	1.85	5.53	7.87	4.02	.34	.87	1.77	32.04
1890.....	.87	1.09	1.16	1.75	2.24	3.33	3.51	3.62	2.39	3.03	.91	.19	24.09
1891.....	.67	2.07	3.13	1.71	2.28	2.67	3.82	3.11	3.31	1.83	1.11	3.76	29.47
1892.....	.48	1.46	2.02	3.70	6.54	5.32	2.18	4.28	.32	.38	1.67	.15	28.52
1893.....	1.06	1.64	2.28	3.64	2.31	1.59	3.76	1.51	1.04	1.84	1.76	1.91	23.34
1894.....	1.51	.25	3.40	5.85	5.62	1.80	.92	.08	2.08	4.99	1.43	1.87	31.70
1895.....	.75	.48	.48	.73	2.13	4.62	3.03	1.67	5.96	.09	1.65	.71	22.30
1896.....	1.30	.19	1.59	4.06	5.18	2.00	1.74	2.41	1.00	3.46	3.42	.84	27.19
1897.....	1.48	2.21	1.34	.72	1.63	3.48	9.29	3.91	3.14	2.11	.78	.85	30.94
1898.....	.38	.89	.75	.41	3.30	3.52	1.33	3.39	1.21	3.39	.94	.19	19.70
1899.....	.67	.66	.82	1.33	4.66	7.10	1.82	6.18	2.05	3.54	.61	1.18	30.62
1900.....	.71	.28	.94	.39	.62	1.05	3.94	6.15	4.80	3.07	.54	.65	23.14
1901.....	.36	.72	1.95	1.23	.97	9.09	4.39	1.70	2.30	2.01	1.28	.68	26.68
1902.....	.74	.70	.77	1.09	3.89	3.68	4.54	3.30	1.52	2.03	1.85	2.03	26.14
1903.....	.83	.67	1.87	2.16	3.54	.79	3.50	3.80	4.76	3.84	.95	1.30	28.01
1904.....	.20	1.25	1.67	.50	1.48	3.78	3.82	3.34	3.48	4.66	.24	.90	25.32

Sun..... 33.49 35.20 53.09 72.30 117.37 145.43 123.46 114.24 117.31 87.58 42.13 43.19 988.45  
 Mean..... \*0.98 \*1.04 \*1.56 \*2.13 \*3.45 \*4.41 \*3.74 \*3.46 \*3.55 \*2.65 \*1.24 \*1.27 \*29.95

Figures in black indicate greatest and least in each column.

\* Mean for 34 years.

† Mean for 33 years.

Entries after May, 1904, not included in footings.

## U. S. DEPARTMENT OF AGRICULTURE,,WEATHER BUREAU

Station: Tower, Minn.

Data: Precipitation.

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	An- nual.
1895.....						4.51	3.33	1.22	3.97	.90	1.50	0.40	.....
1896.....	1.10	1.05	1.35	2.90	5.80	2.95	4.20	4.30	1.90	1.55	2.00	.60	29.70
1897.....	1.92	1.90	1.50	.70	1.60	3.00	9.50	4.65	1.60	2.05	1.30	1.00	30.72
1898.....	.80	1.10	1.45	.80	5.70	7.50	6.00	1.50	2.95	3.01	1.70	.60	33.11
1899.....	.90	1.80	1.30	2.00	3.20	6.40	6.30	5.40	3.55	3.20	.60	1.15	35.90
1900.....	1.00	.50	.30	.80	.60	2.50	3.10	5.40	6.41	.67	.70	.60	22.58
1901.....	.75	.40	2.60	1.00	2.00	7.73	3.00	1.70	2.20	1.50	.90	.95	24.93
1902.....	.70	.20	.52	1.30	7.50	2.00	1.90	4.20	4.90	2.70	2.40	1.80	30.12
1903.....	.80	1.10	1.55	2.60	3.80	1.30	3.20	4.30	5.90	5.00	1.20	.67	31.42
1904.....	.10	.30	2.10	1.34									.....
Total.....	8.07	8.35	12.87	13.44	30.20	37.89	40.53	32.67	33.58	20.58	12.30	7.77	238.48
Mean.....	.90	.93	1.43	1.49	3.78	4.21	4.50	3.63	3.71	2.29	1.37	.86	29.81

## DEPARTMENT OF THE INTERIOR.

## GENERAL LAND OFFICE.

In the matter of the application of the Minnesota Canal and Power Company for the use of certain public lands of the United States in St. Louis and Lake Counties, Minnesota.

## STATE OF MINNESOTA,

*County of St. Louis, ss.*

Daniel J. Maher, being first duly sworn, on oath says that he is and for more than twelve (12) years last past has been a lumberman and during the whole of that time has been familiar with the waters of Birch Lake and the connecting waters down to through Basswood Lake beyond the boundary line between the United States and Canada and in Canada, and he knows that during said period there has never at any time been any running or transportation of logs, lumber, or timber over the said waters from the United States into Canadian waters or from Canadian waters across the boundary into the waters on the United States side; that there is not now and has not at any time been any commerce or traffic in logs, lumber, or timber or any trade or traffic of any kind carried on on said waters between Canadian territory and the United States.

DANIEL J. MAHER.

Subscribed and sworn to before me this 13th day of March, 1905.

H. G. GEARHART.

*Notary Public, St. Louis County, Minn.*

## DEPARTMENT OF THE INTERIOR.

## GENERAL LAND OFFICE.

In the matter of the application of the Minnesota Canal and Power Company for the use of certain public lands of the United States in St. Louis and Lake Counties, Minnesota.

To G. McC. DERBY,

*Major, Corps of Engineers,*

CHARLES L. POTTER,

*Major, Corps of Engineers:*

I beg to call your attention to the number of square miles tributary to each of the lakes on the waterway between Birch Lake and the Lake of the Woods, both lakes inclusive, and the percentage of water which will be diverted therefrom in carrying out the plans of the above-named applicant.

Map No. 10, filed with the Secretary of the Interior in the above matter, shows the drainage area of White Iron and Farm Lakes, Fall Lake and Basswood Lake, and the number of square miles specially tributary to each lake is marked thereon. These areas are indicated upon the map by a fine broken line. The scope of the map is not sufficiently great to show the drainage basins of



the other lakes mentioned. For full information upon the subject I beg to refer to the following table, which shows the individual drainage area tributary to each lake from Birch Lake to the Lake of the Woods, together with the total area tributary to said lakes and the percentage of diversion from each, assuming that the diversion of 600 cubic feet per second is equivalent to deducting the entire run-off from 670 square miles of the Birch Lake drainage basin:

Basin.	Area tributary to lake not including other basins.	Total area above outlet.	Per cent diverted.	
Birch Lake.....	1,100	1,100	61	54.5
Write Iron and Farm.....	120	1,220	55	
Fall Lake.....	171	1,391	48	
Basswood.....	377	1,768	37	34.5
Crooked.....	198	1,966	34	30.5
Lac La Croix.....	2,591	4,557	15	13.1
Namakan Lake.....	2,404	6,961	9.6	8.6
Rainy.....	10,039	17,000	4	3.5
Lake of the Woods.....	11,228	28,228	2.3	2.1

The map shows that there is a complete cut-off of the upper boundary waters from Knife Lake, which lies above Basswood Lake. These upper waters flow through a northern channel along the north side of Hunters Island and finally enter the chain of boundary waters shown on map No. 10 in Lac La Croix through Maligne River.

So far as it now appears there will be little or no use for any of the waters involved above Basswood Lake for navigation purposes after the present growth of timber in that vicinity is cut and removed. If, in any future development of the country, it should be found desirable to improve this stream for purposes of navigation, it would be quite feasible to cut away the narrow land barrier and in that way make it possible for the upper waters to flow through this boundary channel continuously.

The reservoir capacity in cubic feet of the above applicant, already surveyed and carefully calculated, and which can be drawn off into the Embarrass River Canal without lowering its depth of 7 feet, is as follows:

Birch Lake Reservoir, top 13 feet.....	5,762,157,713	
Isabelle Reservoir.....	1,528,241,790	
Kswishiwi Reservoir.....	900,000,000	
		8,190,399,503

The following-named additional reservoirs can be constructed in the Birch Lake Basin:

Crab Reservoir.....	850,000,000	
Lake Alice Reservoir.....	1,150,000,000	
Lake Isabelle Reservoir.....	1,500,000,000	
Two reservoirs on Stony River.....	1,600,000,000	
		5,100,000,000
		13,290,399,503

Additional storage reservoirs which may be created outside of the Birch Lake Basin, including Embarrass and Sabin Lakes and the St. Louis River Canal.....	3,000,000,000	
		16,290,399,503

It would be quite feasible to make a storage reservoir out of Bear Island Lake and use its waters for the general purposes of the applicant and of the public as might be required. The land tributary to that reservoir would not exceed 36 square miles but it could be filled from the Birch Lake Reservoir.<sup>1</sup>

Capacity of reservoir.....	2,006,000,000	
Grand total.....		18,296,399,503

<sup>1</sup> Since this table was made Bear Island Lake has been fully surveyed and will be a part of Birch Lake Reservoir, increasing its capacity to 7,768,157,713, or an aggregate of reservoirs surveyed of 10,196,399,503.

This amount of water, together with the minimum flowage into Birch Lake, would afford a flow of 600 cubic feet per second for 480 days. It is equal to 24 per cent of the mean annual precipitation upon the Birch Lake Drainage Basin or to 60 per cent of the estimated annual run-off of 30,666,240,000 cubic feet. This storage will enable us to control all of the run-off of the Birch Lake Basin and utilize the same for the benefit of the above-named applicant, other interested parties, and the public generally.

The facilities that will be brought into existence by the construction of the Birch Lake, Isabelle, and Kawishiwi Reservoirs will enable the above applicant to provide means for sluicing and running the annual log crop of the St. Croix Lumber Company in a much better and more efficient manner than the means now adopted for that purpose.

The only commercial use now made of these waters lying wholly in the State of Minnesota is by the St. Croix Lumber Co. for their operations at Winton and by the Swallow & Hopkins Co. for towing their logs to the point whereby are deposited in the lake from the line of railroad used in transporting the same. The timber tributary to Basswood Lake on the American side is being handled entirely by Swallow & Hopkins, above mentioned. They deposit their cuttings into that lake, tow them to a point therein in Town 64 North, Range 10 West, nearest Fall Lake. They are then taken from the water, loaded on cars, and hauled by rail to Fall Lake, and there deposited and towed to the mill at Winton.

There is no traffic in logs, timber or otherwise from the United States into Canada or from Canada into the United States over these waters except as above specified, and never has been. The natural market for all products on the American side is to the south by way of Duluth and thence east and west. This is the market for timber products of every kind, and also of iron ore. Nothing is likely to supplant it, on account of the transportation facilities now existing at Duluth and especially on account of the navigation over the chain of Great Lakes.

E. B. BANKS,  
*Engineer.*

STATE OF MINNESOTA,

*County of St. Louis. In District Court, Eleventh Judicial District.*

The Minnesota Canal & Power Company, petitioner, v. William C. Yawkey, Chester A. Congdon, George C. Swallow, et al., defendants.

The petition in the above entitled matter came on for hearing before the court on the 23th day of May, 1904, pursuant to notice thereof duly given; and, it appearing to the satisfaction of the Court that all parties defendant herein had been served with notice of said petition as provided by law, said hearing was duly continued from time to time, and evidence in support of and in opposition to said petition was heard from time to time before the undersigned, one of the judges of said court, until the final hearing thereof on the 31st day of December, 1904.

Messrs. O. H. Simonds, Edmund S. Durment, H. G. Gearhart, and C. O. Baldwin appearing on behalf of said petitioner, and Messrs. Frank Hicks, H. J. Grannis, and J. N. Searles appearing for the St. Croix Lumber Company, and said Frank Hicks and H. J. Grannis appearing for F. W. Paine, Emilie F. Paine, his wife, Otto Jarvenen, Mary Jarvenen, his wife, John Saari, Lizzie Saari, his wife, and Thomas Wiiki, and ——— Wiiki, his wife; Messrs. Joseph B. Cotton and Frank D. Adams appearing for Chester A. Congdon, Clara B. Congdon, his wife, and the Duluth & Iron Range Railroad Company; Messrs. John M. McClintock, W. G. Crosby, and W. J. Donahower appearing for the State of Minnesota, and said W. G. Crosby appearing also for H. W. Emerson, ——— Emerson, his wife, Marion A. Spelman, Frederick B. Spelman; Messrs. Washburn, Bailey & Mitchell appearing for Alexander McRae and Blanche McRae, his wife, Edith V. Davidson, and Oscar Mitchell and Mary Mitchell, his wife; A. E. McManus, Esq., appearing for Cyril Archambault and ——— Archambault, his wife, R. H. Palmer and Mary Palmer, his wife, and The Pokegama Company; all other defendants being in default of appearance herein.

The court having heard the proofs and allegations of the parties and the arguments of the respective counsel now makes the following findings and order:



## FINDINGS.

That the Duluth & Iron Range Railroad Company is a railroad corporation organized and existing under Title One (1), of Chapter Thirty-four (34) of the General Statutes of Minnesota for 1894 and has the power of eminent domain; and that the Andrews Brothers Company, Higgins Land Company, Olean Land Company, St. Croix Lumber Company, Day Brothers Lumber Company, Knox Lumber Company, Tower Lumber Company, and Mesaba Iron Company are each corporations duly organized and existing.

That the petitioner, the Minnesota Canal & Power Company, is a corporation duly organized and existing under Title one (1) of Chapter thirty-four (34) of the General Statutes of Minnesota for the year 1894 as amended, for the purposes and with the powers set forth in said petition as the same has been amended, and is authorized and empowered to carry out the enterprise set forth in its petition herein as amended.

That the public interests require the prosecution of the enterprise described and set forth in the petitioner's petition herein as amended.

That the lands, property, estate, and rights described and set forth in said petition as amended and therein proposed to be taken, and as the same are further limited and defined by this order, are requisite and necessary for the purposes of the enterprise set forth in said petition as amended; and that said petitioner is entitled to take and appropriate the same for the purposes of such enterprise.

For the purpose of determining the rights of the respective parties hereto and of indicating the basis upon which the assessment of damages herein shall be made, it is determined by the Court that, subject to the limitations herein provided, petitioner shall have the right in perpetuity as against the parcels of land hereinafter referred to and as against all persons and corporations interested therein, who are bound by this proceeding, to erect, maintain and operate the dams, and to establish and maintain the reservoirs, and to excavate and maintain the Embarrass river canal, all as, and in the manner, and at the locations, specified in said petition, wherever such specification is made; and, subject to the same limitations and as against the same lands and parties, it shall also have the right to divert from the Birch Lake drainage area into the Embarrass and St. Louis rivers, through and by means of said Embarrass river canal and the necessary dams connected therewith, such a volume of water as may be necessary for the prosecution of its said enterprise, but not exceeding six hundred (600) cubic feet per second; all of such dams shall be provided with all necessary fishways, and shall be constructed with sluiceways, locks, or other fixtures sufficient and so arranged as to permit logs, other timber products and lumber to pass around, through or over said dams at any and all times without unreasonable hindrance or delay. All of said dams and reservoirs shall be so maintained and operated, and such diversion of water shall be so accomplished, and at such times and in such amounts only, as not substantially to interfere with or essentially impair the public use of the streams or lakes upon or about which they may be located, or which may be affected thereby; and all said rights shall be so exercised as not substantially to interfere with or essentially impair the navigability of which said streams and lakes are capable, and so that logs, other timber products and lumber may float down the same without unreasonable hindrance or delay. Petitioner shall have no right to use the waters so to be diverted or any of the other privileges hereby conferred for the purposes of irrigation. Subject to the limitations herein prescribed, petitioner shall have the right to acquire by this proceeding, for the purpose of its said enterprise, including the exercise of the rights herein specified, all those pieces and parcels of land situated in the county of St. Louis and State of Minnesota, which are particularly set forth and described in its petition herein, as the same was amended upon the hearing of this matter, and which are in said petition separately described in parcels, said parcels being numbered respectively from 125 to 335 both inclusive. The amendment referred to related to parcels numbered 332, 334 and 335, as to each of which the description therein was amended by excepting therefrom the right-of-way of the defendant the Duluth & Iron Range Railroad Company, the same being a strip of land two hundred (200) feet in width and extending one hundred (100) feet on each side of the center line of the main track of the railroad of said Company, as the same is now surveyed, constructed and occupied, through and over each of the tracts described in said parcels numbered 332, 334 and 335 of said petition.

The rights of the Duluth & Iron Range Railroad Company in and to its said right of way and in and to its tracks and railroad shall be wholly unaffected by this proceeding.

It is therefore ordered that Marion Douglas, William Getty, and Daniel W. Scott, who are competent and disinterested persons for the performance of the duties hereby imposed, and who are residents of the said county of St. Louis, be, and they hereby are, appointed commissioners to ascertain and determine the amount to be paid by the petitioner to each owner or person interested in any of the lands, property, estates, or interests described in said petition as amended and hereinbefore referred to as compensation for his damage by reason of the taking or injuriously affecting any of said lands, property, estates, or interests for the purpose of the petitioner's enterprise described in its petition as amended, with the limitations and rights herein provided.

As against all persons and corporations named in the petition, or who are bound by this proceeding, upon payment of the damages which shall be awarded by said commissioners, or on appeal therefrom as the law provides, petitioner shall have and acquire the lands, property, estates, and interests so taken or damaged for the purposes in said petition as amended set forth, with the limitations herein provided, and the right to the sole and exclusive use and possession thereof, and the right to carry out its said enterprise and to construct, maintain, and operate in perpetuity all works and improvements set forth in its said petition and which shall be necessary to the successful prosecution of such enterprise.

The first meeting of said commission shall be held at room No. 213 in the Alworth building, Superior street, in the city of Duluth, Minnesota, on Monday, the first day of May, 1905, at 10 o'clock in the forenoon of said day; and the compensation of each commissioner shall be the sum of Seven and 50.100 (7.50) dollars per day for each day actually engaged in the performance of his duties under this order.

Let this order be recorded in the minutes of this court.

Dated March 25, 1905.

By the Court,

WM. A. CANT, *Judge*.

(Seal of Dist. Court, St. Louis Co., Minn.)

Filed in my Office at — o'clock, — m., March 28, 1905.

J. P. JOHNSON,  
*Clerk District Court.*  
By V. A. DASH,  
*Deputy.*

#### CLERK'S CERTIFICATE.

STATE OF MINNESOTA, *County of St. Louis, ss:*

District Court, Eleventh Judicial District.

I, J. P. Johnson, Clerk of the District Court, St. Louis County, and State of Minnesota, do hereby certify that I have compared the foregoing papers writing with the original Order appointing Commissioners in the action therein entitled, now remaining of record in my office, and that the same is a true and correct copy and transcript of said original order appointing commissioners and the whole thereof.

Witness my hand and seal of said court, at Duluth, this 28th day of March, A. D. 1905.

J. P. JOHNSON,  
*Clerk.*  
By V. A. DASH,  
*Deputy Clerk.*

(Seal of District Court, St. Louis Co., Minn.)

In the matter of the application of The Minnesota Canal and Power Company for the use of certain public lands of the United States in St. Louis and Lake Counties, Minnesota.

To Maj. GEO. MCC. DERBY and Maj. C. L. POTTER:

On behalf of Minnesota Canal and Power Company, whose application for leave to flow United States lands has been referred to you for a report and opinion, I desire to offer the following suggestions:



The letter of the Secretary of the Interior in effect propounds three questions to the Secretary of War, which are:

1. Is it the opinion of the War Department that the applicant's enterprise would so far interfere with the navigable capacity of navigable waters of the United States and the government work at War Road Harbor, that its application ought to be denied?

2. Would the effect of applicant's proposed enterprise be such as to bring its works within the purview of Section 10, Act March 3, 1899 (30 Stat., 1151)?

3. Are the waters in which applicant proposes to build its dams such that lawfully they may not be built without the authorization or approval provided for by Section 9 of said Act?

So far as your report and recommendations are concerned the first and second of the questions as above stated are the same; but the answer to third question does not depend upon the same facts as the first and second nor upon the answer to either of them. Applicant's enterprise may be within the prohibition of Section 10 of the Act and yet not within the prohibition of Section 9 of the Act.

APPLICANT'S DAMS DO NOT REQUIRE THE AUTHORIZATION OR APPROVAL PROVIDED FOR IN SECTION 9, ACT MARCH 3, 1899.

This section forbids building a dam (without the authorization prescribed) in any (a) port, (b) roadstead, (c) haven, (d) harbor, (e) canal, (f) navigable river, (g) other navigable water, of the United States. If applicant's proposed dams are forbidden by this section it is because the waters in which it is proposed to build them are "navigable rivers or other navigable waters of the United States." But these waters (Birch Lake and River and Kawishwa River) are not navigable waters of the United States. They may be waters of the United States within the provisions of Section 10 of the Act, i. e., within the control of the United States so far that the United States may prevent their diversion if the diversion would interfere with navigable waters of the United States; but they are not navigable waters of the United States within the meaning of said Section 9. It is made to appear by affidavit before you that no foreign nor interstate commerce ever has been carried on over them. It appears from the profile of the streams, and also from affidavits before you, that no foreign nor interstate commerce is possible on these waters in their ordinary condition because of the falls and rapids between them and the Canadian boundary. It is only waters navigable for foreign or interstate commerce which can be navigable waters of the United States.

In 177 U. S. 621, *Leovy v. U. S.*, is reported a case in which Robert S. Leovy was prosecuted for violation of a statute similar in terms to Section 9, Act March 3, 1899. In that case the court had to determine whether the waters in which the obstruction was placed were "navigable waters of the United States." After quoting from numerous decisions the court says, (p. 632): "It is a safe inference from these and other cases to the same effect which might be cited, that the term 'navigable waters of the United States' has reference to commerce of a substantial and permanent character to be conducted thereon." The trial court instructed the jury that if from the water in one state one can travel by water continuously to another state, and the water is a navigable water, then it is a navigable stream of the United States. But the United States Supreme Court disapproved that instruction and said (p. 633): "Such a view would extend the paramount jurisdiction of the United States over all the flowing waters in the states, &c. \* \* \* When it is remembered that the source of the power of the general government to act at all in this matter arises out of its power to regulate commerce with foreign countries and among the states, it is obvious that what the constitution and the acts of Congress have in view is the promotion and protection of commerce in its international and interstate aspect, and a practical construction must be put on these enactments as intended for such large important purposes." The Supreme Court further said (pp. 633, 634): "We also think that these instructions are open to the further criticism that they contain no reference to the nature or extent of the traffic or trade carried on in Red Pass before the erection of the dam. Indeed the charge necessarily implies that the defendant was guilty if there was merely a capacity for passing from Red Pass into the Mississippi River on any sort of a boat. Very different was the view expressed by Chief Justice Shaw when he said it is not 'every small creek in which a fishing skiff or gunning canoe can be made to float at high water, which is deemed navigable.' But in order to give it the character of a navigable stream

it must be generally and commonly useful to some purpose of trade or agriculture. 21 Pick 344."

"We have heard the testimony offered on behalf of the United States to show the kind and extent of the navigation of the Red Pass, and there is no view we can take of it that warranted the jury in finding that interstate commerce was ever transacted thereon. A few fishermen testified that they occasionally went through this pass with small vessels, carrying oysters for planting, and one or two cargoes of willows and timber were spoken of. None of these witnesses pretended to have carried produce or oysters out of the state."

"We think the defendant was entitled to the instruction asked for, but refused, that the jury should be satisfied from the evidence that Red Pass was at the time it was closed, as alleged in the indictment substantially useful to some purpose of interstate commerce. The instruction actually given was as follows: (The opinion here quotes the charge given by the trial court, and then proceeds as follows):

"It is plain, therefore, that the attention of the jury was not directed at all to the question of any existing interstate commerce, &c."

The purpose of Section 9 is apparent, even upon a casual reading. It is to prevent the placing in waters actually navigated, obstructions to the commerce passing over the waters. It has no reference to preserving the navigable capacity of streams, that being accomplished by the provisions of Section 10.

A consideration of the decision of the Supreme Court above quoted from, and Section 9, inevitably leads to the conclusion that Section 9 applies only to waters on which there is an existing traffic in foreign or interstate commerce. Inasmuch as there is none such on these waters, and cannot be any in the absence of extensive and expensive canals, locks, and dams, which there is no reason to anticipate will ever be constructed, it must be said that applicant's proposed dams do not require the authorization provided for by Section 9, Act March 3, 1899.

IT IS DOUBTFUL THAT APPLICANT'S ENTERPRISE COMES WITHIN THE PURVIEW OF SECTION 10, ACT MARCH 3, 1899; IN ALL PROBABILITY IT DOES NOT.

If applicant's proposed enterprise comes within the meaning of Section 10, it is within the latter portion of that Section—the portion referred to in the letter of the Secretary of Interior; "and it shall not be lawful \* \* \* in any manner to alter or modify the condition or capacity of \* \* \* the channel of any navigable water of the United States, unless, &c." This Section, or a similar Section in a later act came before the United States Supreme Court in 174 U. S. 690, *U. S. v. Rio Grande Dam, &c., Co.* In that case the Dam Company proposed to do what applicant here contemplates, i. e. divert water by means of a dam, and the United States sought to enjoin it from so doing. The court said (p. 708), "Anything wherever done or however done within the limits of the jurisdiction of the United States which tends to destroy the navigable capacity of one of the navigable waters of the United States, is within the terms of the prohibition." But when proceedings to enjoin are instituted (p. 709) "it becomes a question of fact whether the act sought to be enjoined is one which fairly and directly tends to obstruct (that is, interfere with or diminish) the navigable capacity of the stream.. It does not follow that the courts would be justified in sustaining any proceeding by the Attorney General to restrain any appropriation of the Upper Waters of a navigable stream. The question always is one of fact, whether such appropriation substantially interferes with the navigable capacity within the limits where navigation is a recognized fact." The case was remanded to the lower court with instructions (p. 710) "to order an inquiry into the question whether the intended acts of the defendants in the construction of the dam and in appropriating the waters of the Rio Grande will substantially diminish the navigability of that stream within the limits of present navigability, and if so, to enter a decree restraining those acts to the extent that they will so diminish."

It is clear from this decision, and also from the fact that the chief engineer and secretary of war are given authority (by the clear and necessary implication of the language of Section 10) to authorize the course, location, condition, or capacity of the channel of a navigable water of the United States to be altered or modified, that applicant's proposed enterprise is not unlawful unless the effect will be to diminish substantially the navigable capacity of the waters on the boundary between the United States and Canada. It does not appear that the effect of applicant's proposed enterprise will be to diminish



substantially, or at all, the navigable capacity of United States waters. It does appear that in all probability it will not produce any such result.

I am not an engineer, but it seems to me the plain common sense of the matter is this:

1. While it is clear that applicant would divert some water yet it is impossible to determine, except by actually operating the proposed works for some time, what would be the exact effect upon the level of the waters below, or to determine whether the lower waters would be appreciably lowered. This is necessarily true, because no man can know or take into account all the conditions affecting the question. The relative rainfall or precipitation of various portions of the drainage area at different times, the capacity of the inlets and outlets of the various lakes or storage reservoirs, the size and conformation of the basins and banks of the various lakes and streams and their consequent operation and capacity as storage reservoirs, all enter into the determination of the question.

2. Cutting off the waters of the Birch Lake drainage area would not result in a continuous lowering of the waters of Lake of the Woods and Rainy River or Rainy Lake. The basins would fill to the overflow point if much more water were cut off. There is now at all times an overflow from these lakes far in excess of the waters of Birch Lake drainage area. There are flood seasons once or twice each year when the lakes are filled full; every low stage of water is wiped out by a high stage of water several times each year. The effect of cutting off the Birch Lake drainage area might be to cause the low stage to be reached in a slightly shorter period, but not to produce an appreciably lower stage at the period of lowest water.

The usual low-water stage is from four to six weeks, and ninety days is the extreme time of low water. The water area of Lake of the Woods is about 1,600 square miles. The surface in square feet is 44,605,440,000 square feet, and one foot in depth over that surface would be the same number of cubic feet. Six hundred cubic feet per second for ninety days would be 4,665,600,000 cubic feet. This 4,665,600,000 cubic feet is 0.1042 of the 44,605,440,000 cubic feet which make up the top twelve inches of the lake surface. If it were all taken out of the lake at once, in a second of time, it would only lower the level of the lake 0.1042 of a foot, which is 1.25 inches. If we should reduce the area one-fourth, that is to say, to 1,200 square miles, and take out the 4,665,600,000 cubic feet at once it would only lower the level of the lake 1.68 inches. If it were a permanent lowering it could not be said that either the 1.25 inches or the 1.68 inches would substantially diminish the capacity for navigation; but in the ordinary course of operations the lowering would be much less in the ninety days, owing to the large head of stored waters in the upper lakes which would have to be exhausted and to other things.

3. Taking away a comparatively small proportion of the drainage area will not proportionately reduce the depth of the lower waters. These lakes and streams are natural storage basins and will fill up to the outlet of the basin before any will flow out, whatever part of the drainage area be cut off. It is only the height of the water above this inevitable storage which will be affected. Approximately, and on the average, this height above the inevitable storage would not be greater than the difference between the mean low level and ordinary high level, which would be four feet in Lake of the Woods. The Birch Lake Drainage area is 1,100 square miles, and that of Lake of the Woods is 28,000 square miles. That is to say, Birch Lake drainage area is .04 of that of Lake of the Woods. But the applicant seeks to take only .6 of the water from the Birch Lake drainage area, or .024 of the water from Lake of the Woods drainage area. Assuming that the surplus over the inevitable storage is four feet in depth and that the waters would reduce that in like ratio, the reduction would be only 1.153 inches, which can not be said to substantially diminish the navigable capacity of the lake.

#### CONCLUSIONS.

It can not be said that applicant's proposed enterprise will affect the navigable capacity of the Lake of the Woods, Rainy River or Lake, until an actual operation of the same for some time shall demonstrate that it will do so. The probabilities are all that it will not do so, and that, as appears before you now is true of the case of the Chicago drainage canal, there will be no appreciable diminution of depth of navigable waters. Therefore, the enterprise being an important and public one, permission to flow the lands

should be granted. Under the Statute that permission is revocable, but the Secretary of the Interior, for greater safety, might expressly fix in the license the condition that applicant should not at any time operate its dams or divert waters in such way as to impair the navigable capacity of United States waters. That, in effect, is what the United States Supreme Court did in the Rio Grande Dam Co. case hereinbefore cited. This condition necessarily must be stated generally; and only a general condition will protect the public. The result or effect is the thing to be forbidden, and if the condition be stated generally then all means which produce the forbidden end are likewise forbidden.

It must be answered that applicant's proposed dams do not come within the purview of Section 9, because there is no foreign nor interstate commerce conducted on the waters where the dams are to be erected and the dams can not be an obstruction to commerce. Those waters are not navigable waters of the United States, and are subject to the jurisdiction of the United States only so far as necessary to preserve the navigable character of United States navigable waters—that is to say, only so far as within the purview of the last clause of Section 10 of the Act.

Respectfully,

DURMENT & MOORE,  
*Attorneys for Applicant.*



## APPENDIX B.

### STATEMENT OF SHEVLIN-CLARKE CO. (LTD.).

[In re levels of the Lake of the Woods.]

Shevlin-Clarke Co. (Ltd.) has been granted, by the commission, the privilege of filing a statement showing its situation with reference to water levels in the Rainy River and in Rainy Lake, and the effect upon its property of raising the maximum flowage level therein.

This statement is filed in accordance with the privilege so granted. It is intended primarily as a statement of facts, and will be followed by a printed brief, which will discuss more at length the significance of those facts as well as other facts appearing of record before the commission, and state the attitude and contentions of the company with respect to the raising of the level.

1. This company is a corporation organized and existing under the laws of the Province of Ontario.

2. The business of the company is the manufacture and sale of lumber, and as incidental thereto the purchase of logs, the ownership and management of timber lands and licenses, the logging, driving and transportation of logs, and the doing of all things necessary and proper to accomplish its general purposes.

3. The manufacturing plant of the company is situated in the eastern part of the city of Fort Frances, Ontario. The principal buildings consist of two sawmills, a planing mill, a machine and blacksmith shop, storeroom, dry sheds, office, barns, dwelling houses for employees, wharf, boathouse and warehouse. Other component parts of the plant are large lumber yards, spur tracks, unloading dock, and a complete water system; also booms and log storage in the river in front of and above and below the plant. The location and extent of the company's property and plant and its various buildings and facilities (except booms and storage works) are shown on the plat filed as Exhibit 1 to the report of Louis P. Wolff, C. E., hereto attached. A somewhat more detailed description of the plant will be found in Mr. Wolff's report. The plant is comparatively new, mill No. 1 having been completed in 1911, and mill No. 2 in 1913. It is in all respects modern and efficient to the highest degree.

4. The average number of men employed at the plant at Fort Frances during the manufacturing season is about 750. The company employs on the whole an average of about 1,200 men. The average monthly payroll is about \$75,000.

5. The company for the purpose of ascertaining and stating to the commission the effect upon its property of raising the maximum flowage level of Rainy Lake and River, and the measures, if any, which could be taken, to counteract those effects and minimize the resulting damage to the company, employed Louis P. Wolff, of St. Paul, Minn., an engineer of known and recognized standing and ability. His report is appended hereto, and speaks for itself. The facts stated in said report are correct and the company believes that Mr. Wolff's conclusions are not only fair but conservative.

6. Based upon that report, and upon the company's own knowledge of the circumstances and conditions, the company asserts:

(a) The maximum level in the Rainy River can not be raised at all without seriously affecting and damaging the company's property.

(b) The proposed raise to 500 would make it impossible for the company to operate its plant at all, unless the measures and improvements suggested by Mr. Wolff in his report be carried into effect.

(c) These suggested changes and improvements would, however, in no event counteract all of the effects produced by raising the level to 500. Despite all that can be done in this direction, there would exist elements of damage to

the company, with no corresponding benefits. The more important of those elements of damage may be summarized as follows:

First. Lessened facility and greater expense in operation of plants. By way of illustration, and not enumeration, we mention the difficulties occasioned by establishing grade on log spur, and unloading logs over retaining wall.

Second. Decrease in value of land owned by company for purposes other than mill purposes.

Third. Damages caused by interruption of operations during making of changes and improvements.

(d) It is impossible to accurately determine the exact ultimate effect upon and damage to the company's property, if the level is raised, or the expense necessary to carry out the necessary measures to be taken to minimize the resulting damage, or the amount of damage which could not be avoided by the employment of any measures, unless—

First. The exact amount and time of the proposed change in level be known.

Second. Complete plans and specifications be drawn of the works, changes, and improvements in connection with the proposed change in maximum water level.

While Mr. Wolff has suggested certain minimum requirements for the protection of the company's property, in order that the commission may see the magnitude of the damage caused and of the expense necessary to minimize that damage, it is obviously impracticable to measure damages and expense in dollars and cents until some definite proposal and plan is known.

It seems to the company that when it appears, as it does appear, that the proposed change in level unaccompanied by adequate protection will result in the discontinuance of a large industry, with consequences much more serious to the whole community of Fort Frances than to the company itself, it is incumbent upon those interests, governmental or private, which are subserved by the proposed change, to satisfy the commission of the exact way in which the most disastrous consequences can be avoided and the ultimate damages compensated.

Respectfully submitted.

SHEVLIN-CLARKE Co. (Ltd.),  
By E. L. CARPENTER, *President*.

CLAPP & MACARTNEY,  
*Attorneys for Shevlin-Clarke Co. (Ltd.),*  
1406 Merchants' National Bank Building, St. Paul, Minn.

ENGINEERS' REPORT UPON PROPOSED RAISE IN WATER LEVEL ON RAINY RIVER AT  
FORT FRANCES, ONTARIO, AND EFFECT ON PROPERTY OF SHEVLIN-CLARKE Co.  
(LTd.).

FEBRUARY 21, 1916.

SHEVLIN-CLARKE Co. (Ltd.),  
900 First National-Soo Line Building,  
Minneapolis, Minn.,

GENTLEMEN: In compliance with your instructions I have made an examination of your sawmill property at Fort Frances, Ontario, to determine the effect upon this property of raising the maximum flowage level at the Minnesota & Ontario Power Co.'s dam, and more particularly the effect of raising that level from elevation 497 to elevation 500, and beg leave to submit the following report:

The property in question is located on the north bank of the Rainy River near the east end of the city of Fort Frances and is used for sawing lumber and for the storage of lumber, logs, and ties, the location of the property and the principal improvements connected therewith being shown on the accompanying map marked Exhibit No. 1.

The principal buildings on the property consist of two sawmills, a machine and blacksmith shop, storeroom, planing mill, dry sheds, office, barn, and dwelling houses for employees.

A spur track extends from the main line of the Canadian-Northern south through the storage and mill yards to the bank of the Rainy River and thence east in front of the mills and along the river bank to an unloading dock about 1,500 feet east of the company's property. Logs are unloaded from cars and dumped into the boom in the river at all points on this track commencing immediately east of the east (No. 2) mill and running to the east end of the unloading dock. Several sidetracks connecting to this spur are provided for the purpose of loading and unloading lumber and supplies.



The Canadian Government originally reserved a strip 66 feet wide along the entire river front. The Canadian Government has granted to the company the exclusive right to use that portion of this strip in front of the property which the company owns and controls for sawmill purposes and to use a portion of this same strip along the river bank east of the company's property to and including the unloading dock for the construction and maintenance of the spur track and dock, the remainder of this part of the strip being used for highway purposes.

The Canadian Government has also granted to the company boomage rights on the north shore of the Rainy River in front of the company's property and for some distance below and above, and also the right to construct and maintain piers for anchoring booms in Rainy Lake.

The property is well located and well adapted to sawmill purposes, being conveniently situated for the delivery of logs by water from Rainy Lake and by rail from points on the Canadian-Northern Railway, and having excellent facilities for shipping its products both by rail and by water.

At present the maximum height to which the water can be raised at the dam is elevation 497, the water on the gauge at the dam at the time of my examination, February 18 and 19, 1916, being 496.1.

The banks in front of the company's property are below elevation 500, and the general elevation of the ground surface in the yards around the mills varies from 500 to 501, while the ground surface in the storage yards to the north of the mill grounds is several feet higher.

The elevation of the top of the rail of the spur track at mill No. 1 is 500.6 and at mill No. 2 is 499.4 from which point the track runs on a nearly level grade east to the unloading dock.

The conditions existing under the present maximum water level of 497, and its relation to the height of the banks and the levels of the land around the mills, are such that in my opinion the maximum level of the water in Rainy River can not be raised at all without seriously affecting and damaging the property. The amount of damage would of course depend on the proposed maximum level.

In making the report, I have assumed a proposed 500-foot level at the dam which appears to be the only level which has been definitely proposed by anyone. A level higher than 497 and lower than 500 would have the same results (although in a lesser degree) as are set forth below, and to guard against the resulting damage some of the measures that I have below indicated would have to be taken.

The proposed raise of the water level to elevation 500 would make it impossible for the company to operate its plant under present conditions, the principal difficulties being enumerated as follows:

First. The river banks in front of the company's property and for a considerable distance on each side would be submerged by the proposed raise in water level to 500, and the banks when so submerged and subjected to wave action, would be washed away resulting in serious damage to the property.

Second. The elevation of the ground surface in the mill yards being between 500 and 501, would be so near to the proposed water level that the ground would be thoroughly saturated all of the time, and in fact would be converted into a swamp.

Third. The intakes for the water supply to the two mills would be submerged to a greater depth, making the maintenance and repair of these intakes more difficult.

Fourth. The log jacks at the lower end of the log slips of the two mills would be submerged making the operation of the slips more difficult and requiring the services of an extra man at each slip.

Fifth. The railroad track in front of the mills and east to the unloading dock would be submerged, the water being almost on a level with the top of the ties at mill No. 1, 6 inches above the top of the rails at mill No. 2, and from 6 inches to 1 foot or more above the top of the rails for some distance east of mill No. 2 until the track approaches the log dock.

Sixth. The log dock would be submerged which would make it impracticable to use it for the unloading of logs.

Seventh. The space along the river bank in front of the office at the west end of the company's property, which is about elevation 500, is now used for docking the company's towboats when in need of repairs, this being the only space on the river front that is available for this purpose. The raising of the water to the proposed level would make it impracticable to use this space for this purpose.

Eighth. The highway running east from the company's property on the north side of the strip reserved by the Government would be submerged and could not be used for the transportation of supplies to the unloading dock and beyond.

Ninth. The company has constructed booms some distance from the north shore of the river extending in front of the mill property and for a considerable distance above, the booms being anchored at intervals to piles which have been driven both singly and in groups. The tops of these piles are in most cases below elevation 500 and in all cases so near that elevation that with the proposed raise in water level to elevation 500, these anchor piles would be too low to furnish suitable anchorage for the booms.

Tenth. The anchor pier in Itainy Lake would also be too low to provide proper anchorage for the log booms.

Eleventh. At present the sewage from the office at the west end of the grounds and from the large residence at the east end of the company's grounds is discharged into septic tanks adjacent to the buildings and then through outlet pipes into the river. The proposed raise in water level to elevation 500 would submerge both the outlets and the tanks, making it impracticable to use them and leaving these buildings without any means of sewage disposal.

Twelfth. At the present time the storm water is collected in a depression or dry run which is located just east of mill No. 1 and extends back from the river through the mill yards. Raising the water to the proposed level at elevation 500 would cause the river water to back up in this depression a distance of about 700 feet, overflowing a portion of the mill yards and making it more difficult to dispose of the storm water. The elevation of the chain drive which operates the sorting slide is below the 500-foot level and would be submerged.

Thirteenth. The company now has a considerable length of water mains on its grounds with hydrants attached for fire protection, these mains being laid at a depth of about 8 feet below the surface. The proposed raise would raise the ground water level a corresponding amount both on the company's property and on the surrounding territory and would greatly increase the difficulty and expense of making excavations which may be necessary in maintaining and repairing the existing mains or in laying new mains.

It would also make it difficult to prevent hydrants from freezing, as the hydrant barrels could not be drained in the usual manner and would have to be pumped out after being used and inspected at frequent intervals.

Fourteenth. The company's wharf, storehouse, and boathouse, which are located on the river bank at the end of Mosher Street, would be interfered with by any raise in water level.

While the difficulties above enumerated would make it impossible to operate the company's plant with the water at elevation 500, these difficulties can to a certain extent be overcome if suitable remedies are applied. To overcome the difficulties so far as practicable, extensive improvements would be required, the most important of which are as follows:

To protect the property along the river bank from high water and wave action it would be necessary to raise the boat landing in front of the office to elevation 503 and to construct a permanent concrete retaining wall from this boat landing east along the spur track to the unloading dock, a distance of about one-half mile. From the unloading dock a retaining wall or a dike would have to be continued either along the river bank to the Canadian-Northern Railway or carried back from the river bank to the higher ground. From the west end of the company's property the dike would have to be carried either along the river bank to the head of the canal a short distance above the Minnesota & Ontario Power Co.'s dam or back from the river along the west line of the company's property to the higher ground at Church or Scott Street.

The elevation of the top of all dikes and retaining walls should be at least 503 so as to provide a suitable guard against the action of waves and a possible raise above the 500 elevation, which might result from a lack of proper regulation of the water level at the dam.

The retaining wall adjacent to the spur track would have to be of heavy construction to withstand the battering of logs when they are unloaded from the cars.

The dikes should have a top width of not less than 10 feet and a slope of two horizontal to one vertical on the inner side, a slope of about four horizontal to one vertical on the outer side between elevation 503 and 496 to facilitate the landing of boats, and below 496 a slope of about two horizontal to one vertical. The slopes on the river side of the dikes should be riprapped to protect them against the current and against wave action. The boat landing should have riprapped slopes on the river side similar to those above specified for the dikes.



Subsoil drains should be laid back of the retaining walls and dikes to remove any seepage water so as to prevent a rise in ground level and it may also be possible that several lines of draintiles would have to be laid across the company's property for the same purpose.

Provision would have to be made to pump the discharge from the subsoil drains into the river or to carry it by gravity to an outlet below the power company's dam.

With the construction of dikes and retaining walls, the discharge of surface water into the river from the territory back of the dikes and walls would be impossible, and suitable provision would have to be made for the collection of the surface water not only from the company's property but from the entire drainage area back of the dikes and retaining walls, the drainage from which now flows into the river by gravity. The surface water thus collected would have to be either pumped into the river at one or more points or carried by gravity in a trunk sewer parallel with the river and discharged below the power company's dam.

The information at hand in regard to the extent of the drainage area and other features is not sufficient to determine the proper size and capacity of such pumping facilities or trunk sewer, but it is apparent that considerable expense will be involved in making proper provision for the collection and disposal of the surface water.

The construction of the water supply intakes to the power houses of the two mills should be changed so as to facilitate the making of repairs. To do this an intake or receiving well should be constructed inside of the retaining wall at each of the power houses with an inlet extending from each well through the retaining wall and provided at its outer end with a sluice gate and rack. The suction pipes from the pumps would then take the water directly from the receiving wells.

The log slips would have to be reconstructed so that the log jacks and operating platforms would be at a higher elevation. This would require the reconstruction of the entire slips from the outer ends to the top of the inclines.

The spur track can not be raised opposite the mills, as the clear head room between the tracks and the chain slides is now a minimum, and it would be impracticable to raise the chain slides so as to secure any additional head room. To reach the unloading dock, however, the spur track east of the mill would have to be raised so that the tracks would pass over the retaining wall before reaching the dock. This would necessitate an upgrade and would increase the difficulties of operation, which are already considerable on account of the sharp curve west of mill No. 1.

The unloading dock would have to be reconstructed and raised to correspond with the raise in water level.

New anchor piles would have to be driven to provide suitable anchorage for the booms in Rainy River and the old piles would have to be either pulled out or cut off at the bed of the stream so as not to impede navigation when the booms are discontinued, and the anchor pier in Rainy Lake would have to be raised to correspond with the raise in water level.

The sewers from the office and from the dwelling at the east end of the company's grounds would have to be connected with the city sewers, or a new sewer provided for that purpose.

The company's wharf and boathouse at the foot of Mosher street would have to be raised and adjusted to the new conditions.

From the foregoing it is apparent that the improvements required to minimize the difficulties and damage which would result from the raising of the water level as proposed, are of such importance that a considerable expenditure will be required.

Before the proposed raise is authorized, complete and comprehensive plans should be worked out for the improvements which will be required to protect so far as practicable your interests and the interests of all parties affected, and suitable provision should be made for the construction of these improvements.

While the construction of the improvements above outlined, would make it practical to continue the operation of the mills and of the company's business, the facility of operation would nevertheless be interfered with, and the value of the property impaired, without any corresponding benefit.

The only alternative to the making of the above improvements would be the raising of the grounds and all of the buildings, tracks, and other improvements

to an amount equal to the proposed raise in water level and provision for suitable bank protection, but this would be a much more expensive and difficult undertaking and would seriously interfere with the company's operations over a considerable period while the work was going on.

Beside the difficulties and elements of damage above enumerated, there are two other elements of damage which should not be overlooked. One of these is the interference with the operation of the mills which would necessarily take place while the improvements above outlined, such as the retaining wall, sub-soil drains, trunk sewers, and the changes in log slips, railroad track, and unloading docks, are being made, unless these improvements are made during the winter months when the mills are not operating, in which case this element of damage would be lessened.

The other element of damage would be the reduced value of the company's property for other than mill purposes, as the raising of the water level would make this property less desirable as a site for other industries or for residence purposes.

Respectfully submitted.

L. P. WOLFF, *Consulting Engineer.*



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APPENDIX C.

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DIPLOMATIC CORRESPONDENCE.

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LAKE OF THE WOODS LEVELS.

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## DIPLOMATIC CORRESPONDENCE.

FROM THE CHIEF OF ENGINEERS OF THE UNITED STATES ARMY TO  
THE SECRETARY OF WAR.

WAR DEPARTMENT,  
OFFICE OF THE CHIEF OF ENGINEERS,  
Washington, April 26, 1905.

HON. W. H. TAFT,  
*Secretary of War.*

SIR: 1. In the river and harbor act of June 13, 1902, Congress adopted a project for improving Warroad Harbor and Warroad River, Minn. This project is now being carried out, the river and harbor act of March 3, 1905, having made an appropriation of \$35,000 therefor.

2. The improvement depends very largely upon the level of the Lake of the Woods, all the estimates for dredging the harbor and its approaches being based upon the maintenance of this level at or above the datum of 7.2 feet on the Warroad Harbor gauge. During the past year it appears that the gauge only reached that reading for the half of one day, and that it fell as low as 6 feet for several days during the season of navigation. High-water mark is reported to be about 1.51 feet above this reading of 7.2 feet at Warroad.

3. Some years ago the Keewatin Power Co. built a dam across one of the outlets of the Lake of the Woods, near Rat Portage, which dam, it is understood, subsequently passed to the control of the Provincial Government of Ontario, and it is thought that the level of the lake can be easily controlled by inserting or removing stop planks in this dam. There is understood to be much Canadian navigation on the lake, as well as several water-power companies at or near the aforesaid dam, which would be benefited by the maintenance of the lake level at the highest possible datum. In view of this it is thought that an agreement might be reached with the Canadian authorities by which the dam could be so operated as to prevent the level of the lake from falling below the datum of 7.2 feet.

4. I have the honor, therefore, to recommend that the Secretary of State be requested to bring the matter to the attention of the proper authorities of the Dominion of Canada, with a view to such action as will secure the maintenance of this minimum level at the Keewatin Dam.

Very respectfully,

A. MACKENZIE,  
*Brigadier General, Chief of Engineers, United States Army.*

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WAR DEPARTMENT, May 1, 1905.

Respectfully referred to the honorable the Secretary of State, with request for action in accordance with the wishes of the Engineer Department as indicated within.

ROBERT SHAW OLIVER,  
*Assistant Secretary of War.*

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[Inclosure 1 in No. 131.]

FROM THE UNITED STATES SECRETARY OF STATE TO HIS MAJESTY'S  
CHARGÉ D'AFFAIRES AT WASHINGTON.

DEPARTMENT OF STATE,  
Washington, May 6, 1905.

SIR: In the river and harbor act of June 13, 1902, Congress adopted a project for improving Warroad Harbor and Warroad River, Minn. This project is now being carried out, the river and harbor act of March 3, 1905, having made an appropriation of \$35,000 therefor.

The improvement depends very largely upon the level of the Lake of the Woods, all the estimates for dredging the harbor and its approaches being based upon the maintenance of this level at or above the datum of 7.2 feet on the Warroad Harbor gauge. During the past year it appears that the gauge reached that reading only for the half of one day, and that it fell as low as 6 feet for several days during the season of navigation. High-water mark is reported to be about 1.51 feet above this reading of 7.2 at Warroad.

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I have the honor, therefore, to ask if you will be so good as to lay the matter before the proper authorities of the Dominion, with a view to reaching the suggested understanding as to the maintenance of the normal level of the lake in question.

I have, etc.,

FRANCIS B. LOOMIS, *Acting Secretary.*

Mr. HUGH O'BEIRNE, etc.

**FROM HIS MAJESTY'S CHARGÉ D'AFFAIRES TO THE UNITED STATES  
SECRETARY OF STATE.**

BRITISH EMBASSY,  
Washington, May 10, 1905.

SIR: I have the honor to acknowledge the receipt of your note No. 223, of the 6th instant, relative to a suggested understanding with the Canadian authorities for the maintenance of the normal level of the Lake of the Woods, and I beg to inform you that I have laid the matter before the Governor General.

I have the honor to be, with high consideration, sir,

Your most obedient, humble servant,

HUGH O'BEIRNE.

The honorable FRANCIS B. LOOMIS,  
*Acting Secretary of State.*

**FROM HIS MAJESTY'S CHARGÉ D'AFFAIRES TO EARL GREY.**

BRITISH EMBASSY,  
Washington, May 10, 1905.

MY LORD: I am in receipt of a note from the Acting United States Secretary of State, informing me that a project is now being carried out, in pursuance of recent enactments by Congress, for the improvement of Warroad Harbor and Warroad River, Minn.

The improvement, Mr. Loomis states, depends very largely upon the level of the Lake of the Woods, all the estimates for dredging the harbor being based upon the maintenance of the level at or above the mark 7.2 feet on the Warroad Harbor gauge. It appears that during the past year the gauge reached that reading only for the half of one day, and that it fell as low as 6 feet for several days during the season of navigation, high-water mark being reported to be about 1.51 feet above this reading of 7.2 feet at Warroad.

Mr. Loomis goes on to state that some years ago the Keewatin Power Co. built a dam across one of the outlets of the Lake of the Woods, near Rat Portage, which dam, the United States Government understands, subsequently passed to the control of the provincial government of Ontario, and it is thought that the level of the lake could be easily controlled by inserting or removing stop planks in this dam. There is understood to be much Canadian navigation on the lake, as well as several water-power companies at or near the aforesaid



dam, which would be benefited by the maintenance of the lake level at the highest possible level.

In view of these circumstances it is suggested by the Secretary of War, in a letter to Mr. Loomis on the subject dated the 26th ultimo, that an agreement might be reached with the Canadian authorities by which the dam could be so operated as to prevent the level of the lake from falling below the minimum of 7.2 feet.

I am requested by Mr. Loomis to lay the matter before your excellency's Government, with a view to reaching the suggested understanding as to the maintenance of the normal level of the lake in question.

I have, etc.,

HUGH O'BEIRNE.

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**FROM THE ACTING DEPUTY MINISTER OF JUSTICE OF CANADA TO THE  
DEPUTY MINISTER OF PUBLIC WORKS.**

DEPARTMENT OF JUSTICE, *June 30, 1905.*

SIR: I have the honor to transmit herewith a copy of a letter from the British embassy at Washington to his excellency the Governor General, respecting a dam across one of the outlets of the Lake of the Woods near Rat Portage. Would you kindly advise me if your department has any information about this dam, and whether your department has ever exercised any control over it? I would like to have this information at your very earliest convenience, as the matter is one of pressing importance.

I am, your obedient servant,

The DEPUTY MINISTER,  
*Department of Public Works.*

\_\_\_\_\_, *Acting D. M. J.*

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**FROM THE SECRETARY OF PUBLIC WORKS TO THE DEPUTY MINISTER  
OF JUSTICE.**

DEPARTMENT OF PUBLIC WORKS,  
*Ottawa, August 26, 1905.*

The DEPUTY MINISTER,  
*Department of Justice, Ottawa.*

SIR: In compliance with your request of the 30th June last, I beg to inclose you herewith copy of a report prepared by an engineer of this department on a request of the Acting United States Secretary of State to raise the level of the Lake of the Woods, with the view of harbor improvements at Warroad, Minn.

I have the honor to be, sir, your obedient servant,

FRED. GELINAS, *Secretary.*

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SIR: With reference to a letter dated 10th May last from the British Embassy at Washington to his excellency the Governor General and written at the request of the Acting United States Secretary of State, on the subject of raising the level of the Lake of the Woods with the view of harbor improvements at Warroad, Minn., I beg to submit the following report.

It is stated in the letter above mentioned that the estimates for dredging and other harbor improvements contemplated at Warroad are based upon the maintenance of the level of the Lake of the Woods at or above the mark 7.2 feet on the Warroad gauge, that high-water mark is about 1.51 feet higher than this reading of 7.2 feet, and that the level could be easily controlled by inserting or removing the stop logs in the dam built across the western branch of the Winnipeg River, which, with the eastern branch, forms the outlet of the Lake of the Woods at Rat Portage, Ontario.

At the time of my visit to Rat Portage, July 13 last, the gauge readings kept in connection with the dam was 101.1 and the stop logs in the dam were then being removed, as it was considered that should the water in the lake rise higher it would cause inconvenience to the Rat Portage Lumber Co.; in fact, the water stood about 1 inch on the lower floor of the company's mill, and a further rise of 3 or 4 inches would cause the mill to stop operations and flood the land.

The local manager of the Lake of the Woods Milling Co. at Keewatin, Mr. Kelly, also informed me that the level of the lake was then as high as con-

venient for his company's interests, but if the lake level could be controlled within a certain range, say between 98 on the gauge and 101, their best interest would be served.

With the lake at a higher level, the stop logs have to be removed from the dam; the water in the western branch of the Winnipeg River rises considerably and causes a back pressure in the tailrace of the Lake of the Woods Milling Co.'s water wheels, thus diminishing the head by as much as 6 feet at certain times. It is true that some inconvenience is also felt when the lake level becomes low during the fall and winter, when the stop logs are in the dam, but this could only be remedied by the construction of a dam on the eastern branch of the Winnipeg River, which then becomes the only outlet of the lake.

It is therefore established that a higher level than 101 feet on the Rat Portage gauge would cause some inconvenience to the industries at that place. This reading, 101 feet, corresponds to 7.8 feet on the Warroad gauge and is only 0.6 foot higher than the least height of water, 7.2 feet, which the United States engineers wish to obtain in the Warroad Harbor, as the difference between high and low water in the Lake of the Woods is as much as 4 feet, the discharge in the outlets would be greatly increased during high-water seasons, causing the inconvenience referred to above, and during the low-water seasons the waters of the lake could not be retained to the level of 7.2 at Warroad without the construction of another dam across the eastern branch of the Winnipeg River. Also the control of the lake level within such a small range of 0.6 foot is impossible, as water will wall and rise at either end of the lake according to the direction of the wind as much as 1 foot.

Under these circumstances compliance with the request of the Acting United States Secretary of State is not recommended.

I remain, sir, your obedient servant,

U. VALIQUET.

EUGÈNE D. LAFLEUR, Esq., C. E.,  
Chief Engineer Public Works Department.

#### REPORT OF THE MINISTER OF JUSTICE OF CANADA.

MARCH 12, 1906.

TO HIS EXCELLENCY THE GOVERNOR GENERAL IN COUNCIL.

Upon the reference of the dispatch from the British embassy at Washington to your excellency, dated the 10th of May last, respecting the control of the level of the water on the Lake of the Woods, the United States Secretary of State having suggested that an agreement might be reached with the Canadian authorities for controlling the level of the water in the lake by means of a dam built across one of the outlets of the Lake of the Woods near Rat Portage so that the water could not fall below a minimum of 7.2 feet, the undersigned has the honor to report that he is informed by the department of public works that the dam in question was built by the Ontario Government, but was afterwards sold to a company that intended developing the water power. The Government of Ontario, however, retained the control of the stop logs in the dam so that they might be able to regulate the level of the lake. The public works department has submitted a report from Mr. Valiquet, one of their engineers, upon the application of the United States Government (a copy of which is attached hereto). Mr. Valiquet, for reasons stated in his report, is of opinion that the request of the United States should not be granted.

Under these circumstances, the undersigned has the honor to recommend that a copy of the letter from the British embassy and of Mr. Valiquet's report should be submitted to his honor the lieutenant governor of Ontario with a view of ascertaining what the views of the Ontario Government may be with respect to the matter.

The whole respectfully submitted.

A. B. AYLESWORTH, *Minister of Justice.*

#### REPORT OF COMMITTEE OF PRIVY COUNCIL OF CANADA.

P. C. 1094.

[Certified copy of a report of the committee of the privy council, approved by His Excellency the Governor General on the 21st March, 1906.]

The committee of the privy council have had under consideration a dispatch, dated May 10, 1905, from the British embassy at Washington, to the effect that



a project is now being carried out, in pursuance of recent enactments by Congress, for the improvement of Warroad Harbor and Warroad River, Minn.

The minister of justice, to whom the dispatch was referred, submits that the United States Secretary of State having suggested that an agreement might be reached with the Canadian authorities for controlling the level of the water in the lake by means of a dam built across one of the outlets of the Lake of the Woods near Rat Portage so that the water should not fall below a minimum of 7.2 feet, he (the minister) has been informed by the department of public works that the dam in question was built by the Ontario Government but was afterwards sold to a company that intended developing the water power. The Government of Ontario, however, retained the control of the stop logs in the dam so that they might be able to regulate the level of the lake.

The minister further states that, the public works department has submitted a report from Mr. Valiquet, one of their engineers, upon the application of the United States Government. Mr. Valiquet, for reasons stated in his report, is of opinion that the request of the United States should not be granted.

The minister, under these circumstances, recommends that a copy of the letter from the British embassy and of Mr. Valiquet's report be submitted to his honor, the lieutenant governor of Ontario, with a view to ascertain what the views of the Ontario Government may be with respect to the matter.

The committee submit the same for approval.

JOHN J. MCGEE,

*Clerk of the Privy Council.*

His honor the LIEUTENANT GOVERNOR OF ONTARIO.

**FROM ACTING UNDER SECRETARY OF STATE OF CANADA TO THE LIEUTENANT GOVERNOR OF ONTARIO.**

OTTAWA, *March 26, 1906.*

SIR: I have the honor to transmit to you, herewith, copy of a minute of the privy council, dated the 21st instant, and its inclosures, respecting the proposed improvement of Warroad Harbor and Warroad River, Minn., by the United States Government, and to request that the matter may be submitted to your government, in order to ascertain their views with respect to the case.

I have the honor to be, sir, your obedient servant,

P. PELLETIER,

*Acting Under Secretary of State.*

His honor the LIEUTENANT GOVERNOR OF ONTARIO,

*Toronto, Ontario.*

**FROM LIEUTENANT GOVERNOR OF ONTARIO TO SECRETARY OF STATE OF CANADA.**

GOVERNMENT HOUSE,

*Toronto, March 29, 1906.*

SIR: I have the honor to acknowledge the receipt of your dispatch of the 26th instant (No. P-3-1094), covering copy of a minute of the privy council dated the 21st instant, and its inclosures, respecting the proposed improvement of Warroad Harbor and Warroad River, Minn., by the United States Government, and to inform you that the matter will be brought to the attention of my ministers in order that their views may be ascertained in respect to the same.

I have the honor to be, sir, your obedient servant,

WM. MORTIMER CLARK, *Lieutenant Governor.*

The honorable the SECRETARY OF STATE,

*Ottawa, Ontario.*

**FROM SIR H. M. DURAND TO LORD GREY.**

BRITISH EMBASSY,

*Lenox, Mass., September 29, 1906.*

MY LORD: In his dispatch No. 49 of May 10, 1905, Mr. O'Beirne had the honor of communicating to you a project for the improvement of the Warroad Harbor and River in Minnesota, for the execution of which the State Depart-

ment was anxious to secure the assistance and cooperation of the Canadian authorities. I have now received a personal note from the Acting Secretary of State informing me that his department has been asked by interested parties whether any agreement has been reached on the subject.

I have the honor to inquire whether the Dominion Government have yet been able to come to a decision as to the feasibility of acceding to the United States Government's proposals.

I have, etc.,

H. M. DURAND.

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#### REPORT OF COMMITTEE OF PRIVY COUNCIL OF CANADA.

[Extract from a report of the committee of the privy council, approved by the Governor General on the 7th November, 1906.]

The committee of the privy council have had under consideration a dispatch dated September 29, 1906, from Sir H. M. Durand, respecting the project for the improvement of the Warroad Harbor and River in Minnesota.

The minister of justice, to whom the dispatch was referred, recommends that a copy of the dispatch be forwarded to the lieutenant governor of Ontario, with a view of drawing his attention to the minute of council of the 21st March last.

All of which is respectfully submitted for approval.

JOHN J. MCGEE, *Clerk of the Privy Council.*

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#### FROM UNDER SECRETARY OF STATE TO LIEUTENANT GOVERNOR OF ONTARIO.

OTTAWA, November 13, 1906.

SIR: On the 26th March last I had the honor to transmit to you copy of a minute of the privy council, dated March 21, 1906, and inclosures, respecting the proposed improvement of the Warroad Harbor and Warroad River in the State of Minnesota by the United States Government, and asked for the views of your ministers thereon. This dispatch was acknowledged on the 29th March following, but nothing further has been received on the subject.

His Majesty's ambassador at Washington is now pressing for a reply to his previous communication on the subject. I am directed by the secretary of state to ask that you would be good enough to move your ministers to furnish him with a report in this matter.

I have the honor to be, sir, your obedient servant,

JOSEPH POPE, *Under Secretary of State.*

His honor the LIEUTENANT GOVERNOR OF ONTARIO,

*Toronto, Ontario.*

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#### FROM LIEUTENANT GOVERNOR OF ONTARIO TO SECRETARY OF STATE OF CANADA.

GOVERNMENT HOUSE, ONTARIO,

*Toronto, November 20, 1906.*

SIR: I have the honor to acknowledge the receipt of your dispatch of the 13th instant (file No. 1094) upon the subject of the proposed improvement of the Warroad Harbor and Warroad River, in the State of Minnesota, by the United States Government, and to inform you that the matter has been under the consideration of my Government, and that I am now advised that the Government concurs in the finding of the committee of the privy council, and that it considers that the application for the right to control the waters to the height specified should be refused.

I inclose for your general information (1) a copy of a report made in the matter by the engineer of public works and (2) a copy of a report made to my minister of public works by the deputy minister relating to the subject.

I have the honor to be, sir, your obedient servant,

WM. MORTIMER CLARK, *Lieutenant Governor.*

The honorable the SECRETARY OF STATE,

*Ottawa, Ontario.*



## REPORT OF DEPUTY MINISTER OF PUBLIC WORKS OF ONTARIO.

DEPARTMENT OF PUBLIC WORKS, ONTARIO,  
Toronto, July 5, 1906.

Hon. J. O. REAUME,  
*Minister of Public Works, Ontario.*

SIR: In compliance with the communication of the acting under secretary of state for Canada, inclosing copy of a minute of the privy council, dated March 21, 1906, concerning an application of the United States Government respecting the elevation of the water in the Lake of the Woods from falling below a certain minimum of height, I beg to report that, in compliance with your directions, I have, with the chief engineer, gone carefully into the merits of the requisition, and find that it is not desirable that the application should be granted.

The dam at Keewatin is now owned by a private company, but the Ontario government controls and operates the stop logs for the purpose of regulating the water in the Lake of the Woods for navigation and other purposes.

Several large industries interested would be seriously affected if these logs were not carefully operated and the water controlled between a certain maximum and minimum elevation. For several years past this department has been obliged to watch with much care and to operate the dam with diligence in order to prevent damage.

The attached report of the chief engineer of this department deals with the matter of levels, and from the information supplied by him, together with our past experience in connection with this dam and these waters, it would appear that the application for the right to control the waters to the height specified should be refused, and I consequently respectfully recommend that the report of the chief engineer of the department be adopted and that the finding of the committee of the privy council be concurred in.

All of which is respectfully submitted.

I have the honor to be, sir, your obedient servant,

J. W. CAMPBELL,  
*Deputy Minister of Public Works.*

## REPORT OF CHIEF ENGINEER OF PUBLIC WORKS, ONTARIO.

DEPARTMENT OF PUBLIC WORKS, ONTARIO,  
Toronto, June 20, 1906.

Hon. J. O. REAUME,  
*Minister of Public Works, Ontario.*

SIR: Regarding the subject of the level of the Lake of the Woods, with reference to proposed improvements of Warroad Harbor and Warroad River, in the State of Minnesota, by the United States Government, I beg leave to report as follows:

A suggestion has been made by the United States authorities that an agreement might be reached with the Canadian authorities by which the dam at Keewatin could be so operated as to prevent the level of the Lake of the Woods from falling below a minimum of 7.2 feet on the gauge at Warroad Harbor.

It is stated that during the year 1904 the gauge at Warroad reached 7.2 feet for the half of one day only, and that it fell as low as 6 feet for several days during the season of navigation. I find on consulting the records for the year 1904 that the highest reading recorded on the gauge at Rat Portage was 100.90, which occurred on August 16. On August 30 it had fallen to 100.70, on September 30 to 100.60, on October 30 to 99.90, on November 30 to 99.70. The lowest reading for the year was in April—99.50. It will appear from these readings that the level at Rat Portage would require to be held at 100.90 to maintain the elevation of the water at 7.2 on the gauge at Warroad Harbor, the minimum height requested by the United States authorities.

Several large industries would be seriously affected if it were attempted to hold the water of the Lake of the Woods to this elevation throughout the season of navigation.

The sawmill of the Rat Portage Lumber Co., in the town of Kenora, would be in constant danger of flooding, as I find in a report of Mr. Robert McCallum, dated June 15, 1903, that with an elevation of 101.05 on the Rat Portage gauge false floors were laid in the Rat Portage mills to keep the men and materials out of the water, and that considerable inconvenience and annoyance was being experienced owing to the sawdust and refuse getting wet while being carried

to the burner. It is quite evident, therefore, that to maintain a minimum elevation of 100.90 it would be necessary to raise the machinery and lands of the Rat Portage Lumber Co., at a cost of many thousand dollars.

The industries using the water powers at the outlet of the Lake of the Woods would also be seriously injured by maintaining the elevation of the Lake of the Woods at 100.90 during the early period of navigation each year or until the flood waters have passed. The injury sustained by the power users is caused by back water in the Winnipeg River reducing the head on their water wheels. There are obstructions to the flow of the water in the river, the principal one being at Throat Rapids, about 14 miles below Rat Portage. These obstructions cause the water to be held up in the river to such an extent as to reduce the head available from a normal 21 feet to 16 feet, and sometimes even to 15 feet. This loss of head is greatly lessened by allowing the water in the Lake of the Woods to discharge gradually during the early part of the season.

The flood water can be better regulated and the loss of power minimized by having the water at a low stage when the flood water comes down from the tributary streams in Canada and Minnesota, which occurs generally in the month of June. The difficulty of regulating the levels of the Lake of the Woods in the interests of all parties concerned, and especially in the interests of navigation, both in Canada and the United States, would be greatly relieved if the machinery and lands of the Rat Portage Lumber Co. were raised and improvements made in the Winnipeg River below Rat Portage. It is very desirable that these should be carried out, as it is impossible to operate the dam so as to maintain a sufficient elevation for navigation without seriously injuring the industries at Kenora and Keewatin.

While the present conditions exist, the loss to the industries at Kenora and Keewatin by maintaining a minimum elevation of 7.2 feet at Warroad Harbor, would be so great that the request of the United States authorities could not be recommended. If, however, the improvements mentioned above were carried out, there would be no difficulty in the way of making an agreement by which the dam at Keewatin could be so operated as to prevent the level of the Lake of the Woods from falling below 7.2 on the gauge at Warroad Harbor.

I have the honor to be, sir, your obedient servant,

R. P. FAIRBAIN, *Chief Engineer Public Works.*

#### FROM THE SECRETARY OF STATE TO THE SECRETARY OF WAR.

DEPARTMENT OF STATE,  
*Washington, February 24, 1906.*

The honorable the SECRETARY OF WAR.

SIR: I have the honor to inclose herewith, for your consideration, copies of correspondence with the Hon. H. Steenerson, Representative in Congress from Minnesota, on the subject of the level of the water in the Lake of the Woods, in connection with damages which he states have been sustained by certain settlers for whose relief he proposes making provision by legislation.

I have the honor to be, sir, your obedient servant,

ELIHU ROOT.

#### FROM HON. H. STEENERSON TO SECRETARY OF STATE.

HOUSE OF REPRESENTATIVES, UNITED STATES,  
*Washington, D. C., February 12, 1906.*

Hon. ELIHU ROOT,  
*Secretary of State.*

DEAR SIR: On April 26, 1905, Gen. A. Mackenzie, Chief of Engineers United States Army, addressed a letter to the Secretary of War setting forth that by act of Congress of June 13, 1902, an appropriation had been made of \$35,000 for improvements of the harbor at Warroad, Minn., and that the improvement depended largely upon the level of the water in the Lake of the Woods, the dredging and estimates being based upon a 7.2 feet datum on the Warroad Harbor gauge; and that in the late years the stage of water has very rarely reached that point and that it frequently fell during the season of navigation to 6 feet. It is further stated that the Keewatin Power Co., of Ontario, built a dam across the outlet of the Lake of the Woods near Rat Portage, which dam it is understood subsequently passed to the Provincial Government of Ontario and that the level of the water in the Lake of the Woods can be controlled by



inserting or removing stop planks in this dam. There is much Canadian navigation on the Lake of the Woods, as well as several water-power companies which would be benefited by a maintenance of a high level of water in the said lake, and in view of this fact it is believed that an agreement might be reached with the Canadian authorities by which the dam could be so operated to prevent the level of the Lake of the Woods from falling below the datum of 7.2 feet.

The letter closes with a recommendation that the Secretary of State be requested to bring the matter to the attention of the proper authorities of the Dominion of Canada with a view to such action as will secure the maintenance of this minimum level at the Keewatin Dam.

This letter was referred to the Secretary of State on May 1, 1905.

It further appears that in 1896, upon complaint of settlers upon the south shore of the Lake of the Woods, the Department of the Interior sent out an inspector from the General Land Office to investigate the overflow caused by the dam up of the outlet to the Lake of the Woods in Ontario, Canada. This inspector, Col. Naff, made a careful investigation and an exhaustive report saying that the stage of water in the lake had actually been raised at that time about 4 feet by means of dams across the outlet of the Lake of the Woods near Rat Portage, Ontario. This report was referred by the Interior Department to the War Department and by the War Department to the State Department May 20, 1896, and is now on file in your department. I am informed that since that report the dam has been raised so as to raise the level of the Lake of the Woods more than 7 feet.

The south shore of the Lake of the Woods is low and has a large number of small sluggish streams emptying into it, which afford drainage to adjacent lands. These lands were ceded by the Chippewa Indians under the act of January 14, 1889, to the United States Government in trust and are subject to homestead on the payment of \$1.25 per acre. There are hundreds of settlers on these lands who claim that their lands have been overflowed and very greatly injured and damaged by the raise of the level of the water in the Lake of the Woods, and the remaining lands unsettled have been rendered worthless, which has caused a corresponding damage to the Indians who are entitled to the proceeds of the sale of the land.

It appears therefore that the project referred to in the letter of the Chief of Engineers of April 26, 1905, is inconsistent with the interests of these settlers.

I have the honor to request information from your department whether or not any agreement or arrangement has been entered into with the Canadian authorities regarding the subject of raising the level of the water in the Lake of the Woods; and if so, what the arrangement is and whether this Government has requested or consented to the establishment of these dams in the rivers affording an outlet to the said lake. If this Government has made such an arrangement and consented to the establishment of these dams, the Indians and settlers would have a just claim for recompense against this Government, and if not they might perhaps have a claim against the Canadian Government for directly causing injury to their property.

This information is necessary to enable me to make suitable provision by legislation looking to the relief of these people.

Very respectfully,

H. STEENERSON.

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FROM SECRETARY OF STATE TO HON. H. STEENERSON.

DEPARTMENT OF STATE,  
Washington, February 24, 1906.

Hon. H. STEENERSON,  
*House of Representatives.*

SIR: I have the honor to acknowledge the receipt of your letter of the 12th instant, asking information as to whether or not any arrangement has been entered with the Canadian authorities regarding the subject of raising the level of the water in the Lake of the Woods.

In reply, I have the honor to state that a note on this subject was addressed to the British embassy at this Capital on May 6, 1905. The British chargé d'affaires acknowledged the receipt of the department's note on May 10, saying he had referred it to the Canadian Government.

No reply from that Government, or information as to any action taken by it, has been communicated to this department.

I have caused a copy of your letter to be sent to the Secretary of War for his consideration.

I have the honor to be, sir, your obedient servant,

ELIHU ROOT.

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FROM THE SECRETARY OF WAR TO THE SECRETARY OF STATE.

WAR DEPARTMENT,  
*Washington, April 21, 1906.*

SIR: The department duly received your letter of February 24 last, inclosing copies of correspondence with Hon. H. Steenerson, Representative in Congress from Minnesota, on the subject of the level of the water in the Lake of the Woods, in connection with damages which he states have been sustained by certain settlers for whose relief he proposed making provision by legislation.

Replying thereto, I beg to inform you that the War Department does not consider the present time favorable for pressing the request for action by the Dominion authorities toward maintaining the level of the Lake of the Woods at 7.2 on the Warroad gauge, as asked in previous correspondence on the subject, and prefers now that the matter be not urged further on its initiative until brought up again by further developments.

Very respectfully,

WM. H. TAFT, *Secretary of War.*

The honorable the SECRETARY OF STATE.



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## APPENDIX D.

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CERTIFICATES OF THE AUDITOR OF THE  
STATE OF MINNESOTA IN RE LANDS  
PATENTED TO THE STATE.

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## APPENDIX D.

### CERTIFICATES OF THE AUDITOR OF THE STATE OF MINNESOTA.

[In re lands patented to the State.]

OFFICE OF THE ATTORNEY GENERAL,

*St. Paul, March 21, 1916.*

Hon. WHITEHEAD KLUTZ,

*Southern Building, Washington, D. C.*

DEAR SIR: At the hearing at International Falls I promised to secure for the International Joint Commission a statement relative to the State lands involved (see p. 40, printed record), which statement was to show the status of the lands in question, with particular reference to the time that the State acquired the same, and also as to date of survey.

I am herewith inclosing you certificate of State auditor furnishing that information.

Yours, very truly,

CLIFFORD L. HILTON,

*Assistant Attorney General.*

### CERTIFICATES OF AUDITOR OF MINNESOTA.

[In re State lands.]

*ST. PAUL, March 15, 1916.*

I hereby certify that the dates of the surveys of the lands described in Minnesota Exhibit A-1, St. Louis County, Minn., in the townships and ranges referred to, were made on the dates as hereinafter indicated.

That all of the lands described in said Exhibit A-1 have been patented to the State of Minnesota, or secured by the State pursuant to act of Congress of February 26, 1857, without patent (secs. 16 and 36), or secured pursuant to act of Congress February 26, 1859, by approved selection lists (indemnity-school lands):

Township No.	North of range No. west.	Date of survey.
69.....	19	1883
68.....	20	1891
69.....	21	1881
69.....	20	1881

J. A. O. PREUS,

*State Auditor of the State of Minnesota.*

*ST. PAUL, March 15, 1916.*

I hereby certify that the dates of the surveys of the land described in Minnesota Exhibit B-1, Koochiching County, Minn., in the townships and ranges referred to, were made on the dates as hereinafter indicated.

That all of the lands described in said Exhibit B-1 excepting lot 1 of section 11, township 69, range 22 west, which is not State land, have been patented

to the State of Minnesota, or secured by the State pursuant to act of Congress of February 26, 1857, without patent (secs. 16 and 36), or secured pursuant to act of Congress February 26, 1859, by approved selection lists (indemnity-school lands):

Township No.	North of range No. west.	Date of survey.
69.....	22	1899
70.....	22	1881
71.....	22	1881
69.....	23	1899
70.....	23	1898
71.....	23	1882

J. A. O. PREUS,  
*State Auditor of the State of Minnesota.*

ST. PAUL, March 20, 1916.

I hereby certify that the lands described in Minnesota Exhibit A-1, St. Louis County, Minn., which are located in sections 16 and 36, were secured by the State of Minnesota as school lands pursuant to an act of Congress of February 26, 1857; that the other lands located in the following townships and ranges were patented to the State or secured by the State pursuant to approved selection list as indemnity school lands, as follows:

Township 69, north of range 19: SW.  $\frac{1}{4}$  SW.  $\frac{1}{4}$  (lot 4) section 28, SE.  $\frac{1}{4}$  SE.  $\frac{1}{4}$  (lot 10) section 29, NW.  $\frac{1}{4}$  NW.  $\frac{1}{4}$  section 33, August 10, 1907; all the remaining lands in said township and range situate in sections 25, 26, 27, 28, 29, and 32, shown on second sheet of said Minnesota Exhibit A-1, June 13, 1906.

Township 68, north of range 20: All the lands in this township and range in sections 4, 5, 6, 7, 8, 9 shown on third sheet of Minnesota Exhibit A-1, patented June 16, 1896, being swamp land; all school lands shown on page 4 of Minnesota Exhibit A-1 in said township and range in sections 5, 6, and 7, approved selection list May 25, 1906; SW.  $\frac{1}{4}$  SE.  $\frac{1}{4}$  section 8, approved selection list April 10, 1907.

Township 69, north of range 21: All lands on said page 4 in section 7, approved selection list August 10, 1907; all school lands on page 5 in said township and range in section 32, approved selection list August 10, 1907; swamp lands in sections 30, 31, on page 5 of said exhibit, patented to State August 17, 1903.

Township 69, north of range 20: All lands on page 6 of said exhibit being in sections 13, 14, 15, 21, 22, 25, 27, 28, 29, and 31, approved selection list August 10, 1907; all lands on page 8 of said exhibit being in section 32 in said township and range approved selection list August 10, 1907.

Township 69, north of range 21 (swamp land): All lands on page 9 of said exhibit being located in sections 25, 26, 27, 35 of said township and range, date of patent November 4, 1903; all lands (school) on page 10 of said exhibit being situate in sections 1, 12, 4, 5, 8, 9, 10, and 11 (indemnity), approved selection list August 10, 1907; NE.  $\frac{1}{4}$  NE.  $\frac{1}{4}$  (lot 1) section 7, above township and range (swamp), patented November 4, 1915; all lands on page 11 of said exhibit situate in sections 17, 20, 21, 22, 25, 26, 27 (indemnity school), approved selection list August 10, 1907.

Approved selection lists above referred to for indemnity school lands are pursuant to act of Congress, February 26, 1859.

All lands in said Minnesota Exhibit A-1, situate in sections 16 and 36 of any township or range therein, were acquired pursuant to act of Congress of February 26, 1857.

J. A. O. PREUS,  
*State Auditor, State Capitol, St. Paul, Minn.*

ST. PAUL, March 20, 1916.

I hereby certify that the lands described in Minnesota Exhibit B-1, Koochiching County, Minn., which are located in sections 16 and 36, were secured by the State of Minnesota as school lands pursuant to an act of Congress of February 26, 1857; that the other lands located in the following townships and



ranges were patented to the State as swamp lands or secured to the State pursuant to approved selection lists as indemnity school lands, as follows:

Township 69, north of range 22: Lots 1, 2, 3, SW.  $\frac{1}{4}$  NW.  $\frac{1}{4}$ , SE.  $\frac{1}{4}$  NW.  $\frac{1}{4}$ , and NW.  $\frac{1}{4}$  SW.  $\frac{1}{4}$  section 1, July 23, 1902 (swamp); lots 4, 5, and 6, section 1, April 10, 1907 (school); SW.  $\frac{1}{4}$  SE.  $\frac{1}{4}$  and SE.  $\frac{1}{4}$  SE.  $\frac{1}{4}$  section 2, April 10, 1907 (school); all the remainder of the lands in said section 2 described on page 1 of said exhibit, July 23, 1902 (swamp); all the lands in said list situate in sections 3, 4, 5, 6, 7, 8, 9, 10, except lot 1 of section 7, NW.  $\frac{1}{4}$  SW.  $\frac{1}{4}$  and SE.  $\frac{1}{4}$  SE.  $\frac{1}{4}$  section 10, July 23, 1902 (swamp); lot 1, section 7, June 30, 1906 (school); NW.  $\frac{1}{4}$  SW.  $\frac{1}{4}$  and SE.  $\frac{1}{4}$  SE.  $\frac{1}{4}$  section 10, April 10, 1907 (school); lots 2 and 3 and SE.  $\frac{1}{4}$  NW.  $\frac{1}{4}$  section 11, April 10, 1907 (school); the remaining lands in said section 11, July 23, 1902 (swamp); lot 3, section 12, July 23, 1902 (swamp); all the lands in section 17, July 23, 1902 (swamp), excepting the SW.  $\frac{1}{4}$  NE.  $\frac{1}{4}$  and NW.  $\frac{1}{4}$  SE.  $\frac{1}{4}$ , April 10, 1907 (school); lands in section 18, July 23, 1902 (swamp).

Township 70, north of range 22: All lands in this township and range, November 4, 1903 (swamp), excepting the following: NE.  $\frac{1}{4}$  NE.  $\frac{1}{4}$  section 7, NE.  $\frac{1}{4}$  NW.  $\frac{1}{4}$  section 12, SE.  $\frac{1}{4}$  SE.  $\frac{1}{4}$  section 17, lot 4 section 19, NW.  $\frac{1}{4}$  SE.  $\frac{1}{4}$  section 29, SE.  $\frac{1}{4}$  SE.  $\frac{1}{4}$  section 33, NE.  $\frac{1}{4}$  NE.  $\frac{1}{4}$ , NW.  $\frac{1}{4}$  NE.  $\frac{1}{4}$ , and SW.  $\frac{1}{4}$  SW.  $\frac{1}{4}$  section 34, August 10, 1907 (school).

Township 71, north of range 22: Lot 3, section 33, August 17, 1903 (swamp).

Township 69, north of range 23: Lot 4 and SW.  $\frac{1}{4}$  NW.  $\frac{1}{4}$  section 2, July 22, 1902 (swamp); NW.  $\frac{1}{4}$  SW.  $\frac{1}{4}$  section 2, June 30, 1906 (school); lot 1 and SW.  $\frac{1}{4}$  SW.  $\frac{1}{4}$  section 3, July 23, 1902 (swamp); the remainder of said section 3, June 30, 1906 (school); lots 1, 5, and SW.  $\frac{1}{4}$  NE.  $\frac{1}{4}$  section 4, June 30, 1906 (school); lots 3, 4, and 14, section 4, July 23, 1902 (swamp); the remainder of section 4, June 30, 1906 (school); lots 3 and 4, section 9, August 10, 1907 (school); the remainder of section 9, June 30, 1906 (school); NW.  $\frac{1}{4}$  NW.  $\frac{1}{4}$  section 10, June 30, 1906 (school).

Township 70, north of range 23: All lands in section 11, June 25, 1904 (swamp); NE.  $\frac{1}{4}$  SW.  $\frac{1}{4}$  and lot 3, section 12, June 30, 1906 (school); the remainder of section 12, June 25, 1904 (swamp); SW.  $\frac{1}{4}$  SE.  $\frac{1}{4}$  and SE.  $\frac{1}{4}$  SE.  $\frac{1}{4}$  section 26, May 25, 1906 (school); lots 2 and 3, SW.  $\frac{1}{4}$  NW.  $\frac{1}{4}$ , SE.  $\frac{1}{4}$  NW.  $\frac{1}{4}$ , lots 5 and 6, section 34, May 25, 1906 (school); NW.  $\frac{1}{4}$  NE.  $\frac{1}{4}$ , SW.  $\frac{1}{4}$  NE.  $\frac{1}{4}$ , lots 1, 2, 4, NE.  $\frac{1}{4}$  SW.  $\frac{1}{4}$ , and NW.  $\frac{1}{4}$  SW.  $\frac{1}{4}$  section 35, May 25, 1906 (school); lot 3, section 35, April 10, 1907 (school); all remaining lands in said township, June 25, 1904 (swamp).

[SEAL.]

J. A. O. PREUS,

*State Auditor, State Capitol, St. Paul, Minn.*





## ERRATA.

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Mr. Wyvell requests that pages 342 and 343 be amended to read as follows:

“production, and the amount of consumption, leaving it to the engineers, who have been retained to go over the plants, to come in later.

“Mr. WYVELL. May I make a brief objection which I desire to interpose. I wanted to raise the point at what seemed to be an appropriate time. And as Mr. Meyer referred to the possibilities of taking into consideration the power interests after the waters of the Lake of the Woods reach the Winnipeg River, I think that now would be a good time to raise the question.

“I object to the introduction of testimony regarding the power interests below the outlets to the Lake of the Woods upon the ground that waters which do not affect the level of the Lake of the Woods, or which do not immediately flow therefrom, are not within the terms of the reference; that is, that after the waters of the Lake of the Woods have left the outlets of said lake at or near Kenora they have passed beyond the scope of the reference, and the consideration of the possible use of said waters, after they reach the Winnipeg River, is immaterial as far as the purposes of the reference are concerned.

“Mr. TAWNEY. Mr. Wyvell, is this not in effect a modification of the reference?

“Mr. WYVELL. No, indeed; it is an objection made in order that the points contained in the reference can be properly raised.”

And that the remaining portions of pages 342 and 343 may be considered as stricken from the record.





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